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TREASURY DEPARTMENT.
Public Health and Marine-Hospital Service of the United States.
WALTER WYMAN, Surgeon-General.

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HYGIENIC LABORATORY.—BULLETIN No. 24.
M. J. ROSENAU, Director.
SEPTEMBER, 1905.

THE INTERNATIONAL CODE
OF
ZOOLOGICAL NOMENCLATURE
AS APPLIED TO
MEDICINE.

BY

CH. WARDELL STILES.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1905.

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The Hygienic Laboratory was established in New York, at the Marine Hospital on Staten Island, August, 1887. It was transferred to Washington, with quarters in the Butler Building, June 11, 1891, and a new laboratory building, located in Washington, was authorized by act of Congress March 3, 1901.

The following *bulletins* [Bulls. Nos. 1–7, 1900 to 1902, Hyg. Lab., U. S. Mar.-Hosp. Serv., Wash.] have been issued:

No. 1.—Preliminary note on the viability of the *Bacillus pestis.* By M. J. Rosenau.

No. 2.—Formalin disinfection of baggage without apparatus. By M. J. Rosenau.

No. 3.—Sulphur dioxid as a germicidal agent. By H. D. Geddings.

No. 4.—Viability of the *Bacillus pestis.* By M. J. Rosenau.

No. 5.—An investigation of a pathogenic microbe (*B. typhi murium* Danyz) applied to the destruction of rats. By M. J. Rosenau.

No. 6.—Disinfection against mosquitoes with formaldehyd and sulphur dioxid. By M. J. Rosenau.

No. 7.—Laboratory technique: Ring test for indol, by S. B. Grubbs and Edward Francis; Collodium sacs, by S. B. Grubbs and Edward Francis; Microphotography with simple apparatus, by H. B. Parker.

By act of Congress approved July 1, 1902, the name of the "United States Marine-Hospital Service" was changed to the "Public Health and Marine-Hospital Service of the United States," and three new divisions were added to the Hygienic Laboratory.

Since the change of name of the Service the bulletins of the Hygienic Laboratory have been continued in the same numerical order, as follows:

No. 8.—Laboratory course in pathology and bacteriology. By M. J. Rosenau. (Revised edition March, 1904.)

No. 9.—Presence of tetanus in commercial gelatin. By John F. Anderson.

No. 10.—Report upon the prevalence and geographic distribution of hookworm disease (uncinariasis or anchylostomiasis) in the United States. By Ch. Wardell Stiles.

No. 11.—An experimental investigation of *Trypanosoma lewisi.* By Edward Francis.

No. 12.—The bacteriological impurities of vaccine virus; an experimental study. By M. J. Rosenau.

No. 13.—A statistical study of the intestinal parasites of 500 white male patients at the United States Government Hospital for the Insane; by Philip E. Garrison, Brayton H. Ransom, and Earle C. Stevenson. A parasitic roundworm (*Agamomermis culicis* n. g., n. sp.) in American mosquitoes (*Culex sollicitans*); by Ch. Wardell Stiles. The type species of the cestode genus *Hymenolepis;* by Ch. Wardell Stiles.

No. 14.—Spotted fever (tick fever) of the Rocky Mountains; a new disease. By John F. Anderson.

No. 15.—Inefficiency of ferrous sulphate as an antiseptic and germicide. By Allan J. McLaughlin.

No. 16.—The antiseptic and germicidal properties of glycerin. By M. J. Rosenau.

No. 17.—Illustrated key to the trematode parasites of man. By Ch. Wardell Stiles.

No. 18.—An account of the tapeworms of the genus *Hymenolepis* parasitic in man, including reports of several new cases of the dwarf tapeworm (*H. nana*) in the United States. By Brayton H. Ransom.

[Continued on third page of cover.]

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THE INTERNATIONAL CODE OF ZOOLOGICAL NOMENCLATURE AS APPLIED TO MEDICINE.

By Ch. Wardell Stiles, Ph. D.,

Chief of Division of Zoology, Hygienic Laboratory, U. S. Public Health and Marine-Hospital Service.

INTRODUCTION.

Repeated requests have been made by pathologists, bacteriologists, and zoologists of this country that a bulletin be issued giving the present International Rules of Zoological Nomenclature, explaining their use and practical application, and showing their influence upon the nomenclature used in medicine. In response to these requests the present paper has been prepared.

In treating the subject, the code is given seriatim, as at present in force; under each rule or recommendation explanations and examples are given when necessary. In these explanations, however, I do not discuss the subject in my capacity as secretary of the International Commission, but rather in my professional capacity as a zoologist.

Purpose of the code.—Zoologists are obliged to deal with hundreds of thousands of technical names. In a summary of the animal kingdom Ludwig (1886) estimated that there were then 312,015 known species of animals, divided as follows: Vertebrates, 27,100; tunicates, 300; mollusks, 42,215; molluscoidea, 5,160; arthropods, 212,975; worms, 5,700; echinoderms, 6,210; coelenterates, 6,225; protozoa, 6,130. This estimate must be considered as conservative even for the year 1886.

Ashmead (1895) estimated the number of known species of insects at 284,000, a total which exceeds the estimate made by Ludwig (1886) for all the arthropods (insects, mites, crustaceans, etc.). Howard (1905) has been kind enough to estimate for me the total number of known and unknown species of insects for the world, which he thinks is between 3,500,000 and 4,000,000.

Scudder (1882) collated about 79,000 generic and supergeneric zoological names, and Waterhouse (1902) collected 29,683 additional names. Waterhouse estimates that from 1880 to 1900 about 1,150 new generic and supergeneric zoological names were proposed annually.

It is safe to say that the known genera and species of animals represent but a fraction (not over 10 to 20 per cent) of the zoological names which will come into use during the next two or three centuries, for there are extensive areas of the world which are not yet explored zoologically; and when we consider that even in Europe, where work on systematic zoology has been in progress for a century and a half, hundreds of new genera and species are still becoming known, and when we consider further that we are only beginning to know the parasitic protozoa, it is clear that our nomenclatural tasks, are easy, compared with the tremendous number of technical names that future generations will fall heir to.

Under these circumstances it is seen that in order to prevent our science from becoming "a mere chaos of words," every zoological author owes a serious nomenclatural duty not only to himself and his colleagues of to-day, but also to future generations of zoologists.

Linnæus (1751) seems to have appreciated the necessities of his own time, and to no little extent the possibilities of the future, for he proposed a set of rules in accordance with which botanical and zoological names should be used.

If it were left to each author to accept or reject names according to his own personal wishes in the matter, the science of zoology would soon reach a stage in which it would be difficult for one author to understand the writings of another, hence, in order to prevent such a chaotic state, systematists have felt themselves forced to adopt certain rigid rules in accordance with which any given animal shall have only one valid name, and that name shall be valid not only in the country in which it is proposed but in all other lands as well.

The purpose of the International Code of Nomenclature is, therefore, to remove zoological nomenclature from subjective influences and by placing it on an objective basis to make it international; by this plan, a zoologist in South Africa chooses his technical names in accordance with the same rules as does the zoologist in Europe, Asia, Australia, or America.

The code in question deals with nomenclature (namely, with the names of systematic units, such as genera and species), but not with terminology (namely, the names of organs, functions, conditions, etc.).

ORIGIN OF THE INTERNATIONAL CODE.—Reference has already been made to the important fact that Linnæus (1751), the father of modern biological nomenclature, proposed a system of rules of nomenclature. Since it is difficult for one generation to legislate for succeeding generations, it is not strange that later authors discovered that the Linnæan rules, fundamentally good though they were, were not sufficient to meet all the requirements of the advances in the biological sciences, and since the publication (1751) of the Linnæan code various efforts have been made to improve upon the rules he laid down.

Among the most important efforts in this line, mention may be made of the following:

Rudolphi (1801) proposed a set of rules to govern the names of parasites, but he failed to carry out consistently at least one of his most important paragraphs, and much as we owe to Rudolphi for his work in helminthology, work which we all freely admit to be brilliant when judged from the standards of his time, it must be admitted that he has made the nomenclature of parasites rather more involved than would be the case had he been consistent.

One of the most important nomenclatural movements which has ever taken place, and one to which science owes much, was the preparation of the so-called "Stricklandian Code," also known as the "British Association Code" or the "B. A. Code," prepared in 1842–43 by a committee of the British Association for the Advancement of Science. Strange to relate, the American Society of Geologists and Naturalists adopted (1845) this code before it was adopted (1846) by the British Association. For some years American and English zoologists followed this excellent code, which, together with the Linnæan Code (1751) forms the basis of all subsequent study of the subject.

It will be noticed that the Linnæan and Rudolphi codes were proposed by individuals, the former applying to both botany and zoology, the latter only to a restricted group in zoology, while the B. A. Code emanated from a national society of English-speaking scientists. The first movement of an international nature seems to be due to the International Congress of Geology, which in 1881 adopted a code prepared by Douvillé to govern the names of the fossils.

Prior to the Douvillé (1881) code, Dall (1877) prepared a very excellent code at the instance of the American Association for the Advancement of Science, and this set of rules, although never formally adopted by the association, is one of the best essays on the subject that has ever been issued.

The American Ornithologists' Union in 1885 adopted an excellent set of rules, which, known as the "A. O. U. Code," has been followed by many American and foreign zoologists. Excellent as this set of rules is, it rests upon a fundamental theoretical error, so far as general zoological legislation is concerned, namely: This society is a limited society, confined to specialists in a single group, hence zoologists at large had no opportunity to bring forward the difficulties and problems of other groups, and they had no determining vote on the rules in question; under such circumstances, it could hardly be expected that the "A. O. U. Code" should be more than the union claimed for it, namely, a code to govern the scientific names of American birds.

The influence of this code in this country, even in groups other than birds, has been very extensive and very excellent.

To the farseeing judgment of Raphael Blanchard is due the conception of the International Code. Influenced by the view that it was time to adopt a common code for all groups and for all countries, Blanchard proposed a code which was adopted by the first (1889, Paris) and second (1892, Moscow) International Zoological Congresses. His discussion of the principles involved is classical and his essays will remain standard works of reference. Still, the point has been raised that the work involved was too extensive to be properly considered in all detail in a large audience without previous careful study by a representative committee, and while many authors accepted the rules adopted by the two congresses of 1889 and 1892, other authors failed to follow them.

The German Zoological Society (1894) adopted a code of its own, prepared by a special committee, consisting of Carus, Döderlein, and Möbius, and the German members of that society have followed these rules more or less in detail.

When the Third International Zoological Congress met (1895, Leyden) the situation was practically as follows:

English systematists were following the Stricklandian Code; French systematists were following the International Code; German systematists were following the German Code; American systematists were divided between the Stricklandian, the "A. O. U.," the Dall, and the International codes; systematists in special groups were in some cases following special or even personal codes; and systematists of Italy, Russia, and some other countries were following either the International or some other code.

F. E. Schulze proposed to the Third International Congress (1895, Leyden) that an international commission of five members should be appointed to study all of these codes and to consider their similarities and differences. This proposition was supported by Blanchard, and the following commission was appointed: Prof. R. Blanchard (Paris), Prof. J. V. Carus (Leipzig), Dr. F. A. Jentink (Leyden), Dr. P. L. Sclater (London), and Dr. Ch. Wardell Stiles (Washington).

The commission reported progress at the Fourth International Congress (1898, Cambridge) and was increased to fifteen members. This larger commission reported to the Fifth International Congress (1901, Berlin), and the code proposed was adopted. A subcommittee consisting of Blanchard, von Maehrenthal, and Stiles was then instructed to edit the code in English, French, and German, and this duty was completed at the Sixth Congress (Berne, 1904).

The Berne Congress reorganized the permanent commission so that five of its members retire every three years; as at present constituted it is as follows:

To retire in 1907: Dr. R. Horst (Leyden), Dr. F. A. Jentink (Leyden), President David Starr Jordan (Palo Alto, Cal.), Prof. F. E. Schulze (Berlin), Dr. L. Stejneger (Washington).

To retire in 1910: Prof. R. Blanchard (Paris), Prof. L. Joubin (Paris), Dr. Ch. Wardell Stiles (Washington), Prof. Th. Studer (Berne), Prof. R. R. Wright (Toronto).

To retire in 1913: Mr. Ph. Dautzenberg (Paris), Dr. W. E. Hoyle (Manchester), Prof. L. von Graff (Graz), Prof. F. C. von Maehrenthal (Berlin), Prof. H. O. Osborn (New York).

Executive committee: Professor Blanchard (president), Professor von Maehrenthal (secretary), Doctor Stiles (secretary).

POWERS OF THE INTERNATIONAL COMMISSION.—Under the ruling of the International Congress, no proposition for change in the code is permitted to come before the congress, unless it is presented to the Permanent Commission at least one year before the meeting of the congress. Any person in the world has the right to make any nomenclatural proposition, and this is first considered by the executive committee; this committee studies the proposition and then submits it to the commission; the commission considers it and makes recommendation to the congress, which has the final decision in the matter. By this method of procedure it is intended to provide for any additions to the code which may become necessary, but to protect the code from the introduction of any revolutionary and ill-advised changes.

Thus the commission is a deliberative and advisory body, but has no legislative powers; legislation rests with the congress, and membership in this is open to all persons interested in zoology, regardless of country or special field of work.

It would, accordingly, seem that the general scheme of legislative action is well arranged and that provision is made both to insure conservatism and to provide for progress.

Neither the commission nor the congress has any power to force zoologists and others to adopt the International Rules. Every person is still in a position to follow any code he desires or to prepare one of his own, but, considering the responsibilities involved, there is undoubtedly a growing tendency to adopt the International Code. Further, it is considered ethical to ignore names used contrary to this and to other standard codes.

While not attempting to dictate to men of science what they shall or shall not do, the commission submits the rules to the serious consideration of all workers in the spirit advanced by Strickland (1842), namely, "we offer them to the candid consideration of zoologists in the hope that they may lead to sufficient uniformity of method in future to rescue science from becoming a mere chaos of words."

THE INTERNATIONAL CODE.

GENERAL CONSIDERATIONS.

Article 1. Zoological nomenclature is independent of botanical nomenclature in the sense that the name of an animal is not to be rejected simply because it is identical with the name of a plant. If, however, an organism is transferred from the vegetable to the animal kingdom its botanical names are to be accepted in zoological nomenclature with their original botanical status; and if an organism is transferred from the animal to the vegetable kingdom its names retain their zoological status.

RECOMMENDATION.—It is well to avoid introducing into zoology as generic names such names as are in use in botany.

DISCUSSION. Some of the earlier codes attempted to cover both botany and zoology, but the present International Code deals only with zoology (hence not with bacteriology). The same general principles apply to both fields, and on account of the lack of a definite line of demarcation between the animals and plants the zoologist is obliged to consider certain relations of botanical to zoological nomenclature.

In not a few cases the same generic name is used without confusion in both botany and zoology. Botanists do not reject a generic name simply because it is used in zoology, nor do zoologists reject a name simply because it is used in botany. Thus, *Balanus*, *Calamus*, *Lunaria*, and a number of other names are used in both zoology and botany. It is, however, wise to avoid the introduction of a new generic name in one kingdom when it is known to have been used in the other.

In some cases an organism has been described as a plant and later investigations have resulted in transferring it to the animals. In these cases zoologists accept the botanical names. Thus, *Plasmodium malariæ* was originally (1881) classified in a plant genus as *Oscillaria malariæ*. Now that this organism is classified as an animal the original specific name *malariæ* (1881) is accepted in zoology with its original botanical date. The generic name *Oscillaria* is not taken over with the specific name because it was not proposed for this organism. *Oscillaria* remains, as it was prior to 1881, a plant genus.

In still other cases organisms have been described as animals and afterwards classified as plants. Thus, *Coccidioides immitis* was provisionally classified with reserve as a sporozoon, but was later placed among the plants. The generic name, however, having once been used in the animal kingdom for one organism, can not be used for any other organism classified as an animal, despite the fact that the original *Coccidioides* is no longer viewed as an animal. The names *Bacillus*, *Bacterium*, *Spirillum*, *Spirochæta*, and *Vibrio* are of interest in this general connection, since the bacteria were first classified as animals, later as plants, while *Spirochæta* has now been transferred again to zoology.

Spirochæta Ehrenberg, 1834a, 169, was proposed as a genus of protozoa; it was then classified among the plants; more recently it has been returned to the animal kingdom. Although for years this genus was classified among the plants, it still retained its zoological status. This case will illustrate the necessity for the rule given above. Had zoologists admitted *Spirochæta* as valid for some new genus (cf. *Spirochæta* Sars., 1856, a worm) on the ground that the original *Spirochæta* had been eliminated from the animal kingdom, it would now be necessary to change the name of the later *Spirochæta* genus upon the return of *Spirochæta*, 1834, to the animal kingdom.

Art. 2. The scientific designation of animals is uninominal for subgenera and all higher groups, binominal for species, and trinominal for subspecies.

Discussion.—Prior to the introduction of the Linnæan system of nomenclature, organisms were generally given a polynominal name, which in many cases was identical with the description. The Linnæan system introduced into zoology and botany the custom of using two names, hence it is frequently called the "binomial" system. These names referred to two things, or two systematic units (namely, the genus and the species), hence the Linnæan method is frequently known as the "binary" system. One of these names is the *generic* name (corresponding to the family name or surname of persons), the other is the *specific* name (corresponding to the Christian name of persons). Thus, man as a systematic unit is known as *Homo sapiens;* the tiger is *Felis tigris*, the lion *Felis leo*. In the case of the feline animals, *Felis* is the generic name (corresponding to the family name *Smith*), while *tigris* and *leo* are specific names (corresponding to *John*, *Frank*, *Mary*, etc.). When the generic name is combined with a specific name, as *Felis tigris*, the combination is known as the "binomial."

In some instances it is convenient to recognize a systematic unit of lower value than the species; such units are known as *subspecies*. Thus, the wild boar is known as *Sus scrofa;* but the domesticated hog is recognized as more or less distinct from the boar, yet not sufficiently distinct to be given full specific rank. It is classified as a subspecies, *Sus scrofa domestica*, the combination of the generic, the specific, and the subspecific names representing the "trinomial."

The use of a trinomial, such as *Sus scrofa domestica* or *Fratercula artica glacialis*, in a subspecific sense should not be confused with expressions like *Bacillus coli communis*. This latter expression can claim no standing in nomenclature, for *communis* was not proposed as a subspecies of any species known as *Bacillus coli*.

Turning now to zoological names used by physicians, it should be noticed that *Tænia*, *Plasmodium*, *Amœba*, *Culex*, *Stegomyia*, *Bacillus*, *Bacterium*, etc., are generic names, while *Tænia saginata*, *Plasmodium malariæ*, *Amœba coli*, *Culex pipiens*, *Stegomyia fasciata*, *Bacillus icteroides*, *Bacterium anthracis*, etc., are binomials applied to species, and *Tænia solium abietina* was used as a trinomial for a supposed variety of *Tænia solium*.

In order that names may claim recognition, they must always be proposed in the sense given above, and unless they are proposed in the manner indicated they are not considered in establishing the correct name for any systematic unit. Thus *Filaria sanguinis hominis nocturna* is a polynomial applied to a species, hence it has no status in nomenclature; we may of course quote it as a matter of historic interest or in a bibliographic citation, but in determining the correct name of the animal to which it was applied the name is to be completely ignored.

Art. 3. The scientific names of animals must be words which are either Latin or Latinized, or considered and treated as such in case they are not of classic origin.

Discussion. The adoption of Latin names rests both upon the historical development of nomenclature and upon practical considerations. Earlier scientific authors wrote in Latin, hence they naturally used Latin names, and these have been preserved by more recent authors.

The chief object of the use of Latin names is based upon practical considerations. Assuming that there are 10,000,000 species of animals in the world (assuredly an ultraconservative estimate), it would be a practical impossibility to keep record of them unless international names were used. If we had to record for each of these 10,000,000 species an English, French, German, Italian, Russian, and perhaps a Japanese and a Chinese name, zoology would consist chiefly of a study of languages. It is not considered a practical proposition to attempt to adopt any modern language as basis for the names, as questions of national pride would arise which would doubtless exclude any agreement. But every nation which studies zoology also studies Latin to a greater or less extent, and by adopting Latin no one nationality is called upon to make any greater concessions than is any other.

Nothing is stated in the rule as to what particular Latin should be used, but latitude is granted to use Latin or Latinized names, or to use names as if they were Latin. This latitude has its practical basis.

The Latin poets and authors did not foresee the practical scientific use to which their language would be applied, and they failed to leave enough Latin words as names for the millions of animals and plants which come into consideration. Hence, as a carpenter, a sailor, or a manufacturer coins words which are accepted in English as English words of good standing, when applied to carpentry, nautical affairs, and trade, the zoologists and botanists coin words upon Latin precedents, which we adopt as botanical and zoological Latin. In not all cases do our efforts attain the highest standards of classical Latin (*Tænia solium*, and *Gadus tomcod*, for instance), but because of practical considerations such names are retained, although not recommended as examples to be followed in coining new words.

As an instance in which zoologists take considerable liberty with Latin special mention may be made of the family and subfamily names, the rule for their formation being based upon practical considerations rather than upon classical precedent.

Many authors have used vernacular names in a vernacular sense without giving a Latin equivalent. This is particularly the case with certain earlier French authors. Later authors have not infrequently Latinized these vernacular names and the Latinized form has been adopted. In all these cases the vernacular names have no status whatever in nomenclature, and the author who later Latinized the name or used it as a Latin name is the person who is considered its author. Thus Redon, 1883, described for man a "*Tænia algérien*," which Pepper (1894) has quoted as *Tænia algeriana* and Braun (1894) as *Tænia algeriensis*. In this case *Tænia algérien* is a vernacular name, and its author (Redon) is in no wise connected with the names *Tænia algeriana* and *T. algeriensis*, which should be attributed to Pepper and Braun, respectively, despite the fact that it was Redon who described the parasite. In following this plan we are not attempting to rob Redon of any supposed credit which belongs to him, but we do not hold him responsible for names introduced by later authors.

FAMILY AND SUBFAMILY NAMES.

Art. 4. The name of a family is formed by adding the ending *idæ*, the name of a subfamily by adding *inæ*, to the root of the name of its type genus.

Discussion.—Closely related genera are collected into families, and when desirable an intermediate systematic unit (the subfamily) is recognized between the genus and the family; in other words, closely related genera are collected into subfamilies and closely related subfamilies are collected into families.

One genus in each subfamily represents the type of the subfamily, namely, its standard of reference; and one genus in the family represents the standard of reference of the family. In forming the family and subfamily names the name of the type genus is taken as basis, and the endings *idæ* and *inæ* are added to the root of the generic name in question. Thus the tapeworms in man are classified as follows:

Family *Tæniidæ*, based upon *Tænia* as its type genus.
  Subfamily *Tæniinæ*, based upon *Tænia* as its type genus.
    Genera *Tænia* and *Echinococcus.*
  Subfamily *Dipylidiinæ,* based upon *Dipylidium* as its type genus.
    Genera *Dipylidium* and *Hymenolepis.*
  Subfamily *Davaineinæ*, based upon *Davainea* as its type genus.
Family *Dibothriocephalidæ*, based upon *Dibothriocephalus* as its type genus.
  Subfamily *Dibothriocephalinæ*, based upon *Dibothriocephalus* as its type genus.
    Genera *Dibothriocephalus*, *Diplogonoporus*, and *Sparganum.*

A moment's consideration will show that this method of forming family and subfamily names is based upon practical considerations; by having a uniform set of endings we know that any name ending in *idæ* is of family rank, while one ending in *inæ* is of subfamily rank. Further, by using a prominent generic name as basis for the family and subfamily names we aid the memory in locating the systematic position of the groups.

Art. 5. The name of a family or subfamily is to be changed when the name of its type genus is changed.

DISCUSSION.—While one of the fundamental purposes of the code is to prevent an *unnecessary* change of names, it is considered that under certain circumstances changes must be made for the general good. As illustrating such an event, and as explaining article 5, the following example may be taken:

"*Distoma hepaticum*" is a parasite mentioned in most works on practice of medicine; it is frequently classified in the family "*Distomidæ*," of which it forms the "type." The correct name of this parasite is *Fasciola hepatica*, and upon suppressing the generic name *Distoma*, in favor of *Fasciola*, the family name *Distomidæ* is changed to *Fasciolidæ*. Were this change not made, we should be obliged to carry in our minds a family name (*Distomidæ*) and a subfamily name (*Distominæ*) without any direct clue as to their systematic position; further, in this and in many other instances confusion would arise between the family name of this group of parasitic worms, and a family name used for an entirely different set of animals.

GENERIC AND SUBGENERIC NAMES.

Art. 6 Generic and subgeneric names are subject to the same rules and recommendations, and from a nomenclatural standpoint they are coordinate, that is, they are of the same value.

DISCUSSION.—The question as to whether a given systematic unit should be given generic or subgeneric rank, is to no little extent subjective, and our ideas change in regard to a given case as our knowledge of the group increases. Hence, we treat generic and subgeneric names *nomenclaturally* as of the same rank and as interchangeable.

Thus, most authors recognize that *Tænia* is to be divided into the subgenera *Tænia*, *Multiceps* (i. e., *Cœnurus*), and *Echinococcus*. Some authors, however, incline to recognize these subgenera as of full generic rank. By subjecting both generic and subgeneric names to the same rules, and granting them equal rank from a *nomenclatural* point of view, regardless of the recognized systematic point of view, confusion is lessened, and we gradually become accustomed to associating certain species together in groups, to which generic rank may later be given.

Art. 7. A generic name becomes a subgeneric name, when the genus so named becomes a subgenus, and vice versa.

Discussion.—If an author, in revising the genus *Tænia*, concludes that the subgenera *Multiceps* and *Echinococcus* should be given generic rank, he is called upon to use these subgeneric names as names of the genera he recognizes; if a later author differs in opinion and reduces these genera to subgenera, he still retains the same names as names of his subgenera.

This rule is based upon a fundamental principle of nomenclature too frequently overlooked, namely, *in naming a systematic unit we name the object*, *not our concept of the object.* If we name a given genus, we do not confine the name to the animals which come within *our* description of the genus, but we propose a generic name to be used for all animals which agree generically with our type species, be they known to us or not; some later author may have a different concept of the extent of the genus, but as long as he classifies species generically with the species which we have designated as the generic type, our generic name—even if used originally in a more restricted or a less restricted sense—is valid, provided it fulfills all the conditions demanded of it by the code.

Art. 8. A generic name must consist of a single word, simple or compound, written with a capital initial letter, and employed as a substantive in the nominative singular. Examples: *Canis*, *Perca*, *Ceratodus*, *Hymenolepis.*

Discussion.—It is quite a common occurrence to find in medical writings "*bacillus tuberculosis*," "*plasmodium malariæ*," "*amœba coli*," "*tænia solium*," etc., the generic names being written with small initial letter. Zoologists and botanists adopt a capital initial letter for the generic name, because of the aid this gives them in quickly recognizing the rank of the name; thus, if we find "*Heterophyes*," we know that reference is made to a certain genus of flukes, one species of which occurs in man; if we find *heterophyes* used in a paragraph in which *Heterophyes* is discussed, we know that *heterophyes* refers, not to the genus as a whole, but to the particular species that occurs in man. This custom of capitalizing the generic name has come down to us from former centuries, and while it now has its practical basis, its historic basis is probably due to the custom earlier authors had of capitalizing all Latin substantives when used in nomenclature. At present the custom is so thoroughly established that botanists and zoologists experience much the same sensation in seeing "*bacillus tuberculosis*" or "*plasmodium malariæ*," instead of *Bacillus tuberculosis* and *Plasmodium malariæ*, that they would if they found a reference to "american" authors or to "doctor s. weir mitchell."

RECOMMENDATIONS.—The following words may be taken as generic names:

a. Greek substantives, for which the rules of Latin transcription (see Appendix F) should be followed. Examples: *Ancylus*, *Amphibola*, *Aplysia*, *Pompholyx*, *Physa*, *Cylichna*.

b. Compound Greek words, in which the attributive should precede the principal word. Examples: *Stenogyra*, *Pleurobranchus*, *Tylodina*, *Cyclostomum*, *Sarcocystis*, *Pelodytes*, *Hydrophilus*, *Rhizobius*.

This does not, however, exclude words formed on the model of *Hippopotamus*, namely, words in which the attributive follows the principal word. Examples: *Philydrus*, *Biorhiza*.

c. Latin substantives. Examples: *Ancilla*, *Auricula*, *Dolium*, *Harpa*, *Oliva*. Adjectives (*Prasina*) and passed participles (*Productus*) are not recommended.

d. Compound Latin words. Examples: *Stiliger*, *Dolabrifer*, *Semifusus*.

e. Greek or Latin derivatives expressing diminution, comparison, resemblance, or possession. Examples: *Dolium*, *Doliolum*; *Strongylus*, *Eustrongylus*; *Limax*, *Limacella*, *Limacia*, *Limacina*, *Limacites*, *Limacula*; *Lingula*, *Lingulella*, *Lingulepis*, *Lingulina*, *Lingulops*, *Lingulopsis*; *Neomenia*, *Proneomenia*; *Buteo*, *Archibuteo*; *Gordius*, *Paragordius*, *Polygordius*.

f. Mythological or heroic names. Examples: *Osiris*, *Venus*, *Brisinga*, *Velleda*, *Crimora*. If not Latin, these should be given a Latin termination (*Aegirus*, *Göndulia*).

g. Proper names used by the ancients. Examples: *Cleopatra*, *Belisarius*, *Melania*.

h. Modern patronymics, to which is added an ending to denote dedication:

α. Names terminating with a consonant take the ending *ius*, *ia*, or *ium*. Examples: *Selysius*, *Lamarckia*, *Kollikeria*, *Mulleria*, *Stalia*, *Kroyeria*, *Ibañezia*.

β. Names terminating with the vowels *e*, *i*, *o*, *u*, or *y* take the ending *us*, *a*, or *ium*. Examples: *Blainvillea*, *Wyvillea*, *Cavolinia*, *Fatioa*, *Bernaya*, *Quoya*, *Schulzea*.

γ. Names terminating with *a* take the ending *ia*. Example: *Danaia*.

δ. In generic names formed from patronymics, the particles are omitted if not coalesced with the name, but the articles are retained. Examples: *Blainvillea*, *Benedenia*, *Chiajea*, *Lacepedea*, *Dumerilia*.

ε. With patronymics consisting of two words, only one of these is used in the formation of a generic name. Examples: *Selysius*, *Targionia*, *Edwardsia*, *Duthiersia*.

ζ. The use of proper names in the formation of compound generic names is objectionable. Examples: *Eugrimmia*, *Buchiceras*, *Heromorpha*, *Mobiusispongia*.

i. Names of ships which should be treated the same as mythological names (*Vega*) or as modern patronymics. Examples: *Blakea*, *Hirondellea*, *Challengeria*.

j. Barbarous names, that is, words of nonclassic origin. Examples: *Vanikoro*, *Chilina*. Such words may receive a Latin termination. Examples: *Yetus*, *Fossarus*.

k. Words formed by an arbitrary combination of letters. Examples: *Neda*, *Clanculus*, *Salifa*, *Torix*.

l. Names formed by anagram. Examples: *Dacelo*, *Verlusia*, *Linospa*.

DISCUSSION.—A person who is not accustomed to dealing with a large number of generic names, and even authors who are well trained in the subject, frequently find it difficult to coin or to select names for new genera. To aid them in their labors, the foregoing recommendations, based upon an analysis of thousands of names already in use, have been inserted into the code.

Art. 9. If a genus is divided into subgenera, the name of the typical subgenus must be the same as the name of the genus (see Art. 25).

DISCUSSION.—Subgenera are used in zoology by a number of authors, but other authors avoid them. Not infrequently it will be noticed that the species of a given genus may be classified into several natural groups, to which an author does not feel justified at the moment in giving full generic rank; to express the systematic relations of these species and groups an author may recognize subgenera. One of these subgenera naturally contains the type species of the genus, and this is known as the typical subgenus. Unfortunately, some authors have proposed new names for the typical subgenera, but the law of priority (Art. 25) demands that the typical subgenus must have the same name as the genus itself.

Thus *Tænia* has been divided into the following subgenera: *Tænia*, type *solium*; *Multiceps* (or *Cœnurus*), type *cerebralis*; *Echinococcus*, type *echinococcus*=*granulosus*. Some authors have recognized *Cystotænia* as the name of the typical subgenus, but this is inadmissible under the code. By using *Tænia* instead of *Cystotænia* the nomenclature remains the same in the writings of those authors who recognize subgenera and those who raise subgenera to generic rank.

Art. 10. When it is desired to cite the name of a subgenus, this name is to be placed in parentheses between the generic and the specific names. Example: *Vanessa* (*Pyrameis*) *cardui*.

DISCUSSION.—Even when subgenera are recognized it is not necessary to quote the subgeneric name every time the species are cited, but if the subgeneric name is quoted it should be placed in parentheses. Some authors have used the parenthesis in a different and somewhat confusing manner; not infrequently a well-known genus is split up into distinct genera and an author occasionally cites the old generic name to show the former position of the species. Thus we find references like *Hymenolepis* (*Tænia*) *nana*, the author meaning that he classifies *Tænia nana* as *Hymenolepis nana*. It is much better in these cases to write [*Tænia*] *Hymenolepis nana*, thus avoiding the appearance of making *Tænia* a subgenus of *Hymenolepis*.

SPECIFIC AND SUBSPECIFIC NAMES.

Art. 11. Specific and subspecific names are subject to the same rules and recommendations, and from a nomenclatural standpoint they are coordinate—that is, they are of the same value.

Discussion.—See under article 6.

Art. 12. A specific name becomes a subspecific name when the species so named becomes a subspecies, and vice versa.

Discussion.—See under article 7.

Art. 13. While specific substantive names derived from names of persons may be written with a capital initial letter, all other specific names are to be written with a small initial letter. Examples: *Rhizostoma Cuvieri* or *Rh. cuvieri*, *Francolinus Lucani* or *F. lucani*, *Hypoderma Diana* or *H. diana*, *Laophonte Mohammed* or *L. mohammed*, *Œstrus ovis*, *Corvus corax*.

Discussion.—Formerly all substantive specific names were capitalized, while most adjectival specific names were written with a small initial letter. Then the custom relative to specific names changed to confining the capital to names derived from proper names. Later the capitals were restricted to names derived from names of persons, and finally the use of capitals in specific names was entirely rejected, except that names derived from names of persons *may* be written with a capital. The use of the capital is a convenience in distinguishing between a specific name like *Gobii*, based upon the surname *Gobi*, and a specific name *gobii* based upon the generic name *Gobius*. There is now a decided tendency to reject the use of capitals in specific names.

Art. 14. Specific names are:

a. Adjectives, which must agree grammatically with the generic name. Example: *Felis marmorata*.

b. Substantives in the nominative in apposition with the generic name. Example: *Felis leo*.

c. Substantives in the genitive. Examples: *rosæ*, *sturionis*, *antillarum*, *galliæ*, *sancti pauli*, *sanctæ helenæ*.

If the name is given as a dedication to one or several persons, the genitive is formed in accordance with the rules of Latin declination in case the name was employed and declined in Latin. Examples: *Plinii*, *Aristotelis*, *Victoris*, *Antonii*, *Elisabethæ*, *Petri* (given name).

If the name is a modern patronymic, the genitive is always formed by adding, to the exact and complete name, an *i* if the person is a man, or an *æ* if the person is a woman, even if the name has a Latin form; it is placed in the plural if the dedication involves several persons of the same name. Examples: *Cuvieri*, *Möbiusi*, *Nuñezi*, *Merianæ*, *Sarasinorum*, *Bosi* (not *Bovis*), *Salmoni* (not *Salmonis*).

Recommendation.—The best specific name is a Latin adjective, short, euphonic, and of easy pronunciation. Latinized Greek words or barbarous words may, however, be used. Examples: *gymnocephalus*, *echinococcus*, *ziczac*, *aguti*, *hoactli*, *urubitinga*.

Art. 15. The use of compound proper names indicating dedication, or of compound words indicating a comparison with a simple object, does not form an exception to Art. 2. In these cases the two words composing the specific name are written as one word with or without the hyphen. Examples: *sanctæ-catharinæ*, or *sanctæcatharinæ*, *janmayeni* or *janmayeni*, *cornu-pastoris* or *cornupastoris*, *cor-anguinum* or *coranguinum*, *cedo-nulli* or *cedonulli*.

Expressions like *rudis planusque* are not admissible as specific names.

Art. 16. Geographic names are to be given as substantives in the genitive, or are to be placed in an adjectival form. Examples: *sanctipauli*, *sanctæ-helenæ*, *edwardiensis*, *diemenensis*, *magellanicus*, *burdigalensis*, *vindobonensis*.

Recommendation.—Geographic names used by the Romans or by Latin writers of the middle ages are to be adopted in preference to more recent forms. Words like *bordeausiacus* and *viennensis* are poor, but are not to be rejected on this account.

Art. 17. If it is desired to cite the subspecific name, such name is written immediately following the specific name, without the interposition of any mark of punctuation. Example: *Rana esculenta marmorata* Hallowell, but not *Rana esculenta* (*marmorata*) or *Rana marmorata* Hallowell.

Art. 18. The notation of hybrids may be given in several ways; in all cases the name of the male parent precedes that of the female parent, with or without the sexual signs:

a. The names of the two parents are united by the sign of multiplication (×). Example: *Capra hircus* ♂ × *Ovis aries* ♀ and *Capra hircus* × *Ovis aries* are equally good formulæ.

b. Hybrids may also be cited in form of a fraction, the male parent forming the numerator and the female parent the denominator. Example: $\frac{\textit{Capra hircus}}{\textit{Ovis aries}}$. This second method is in so far preferable that it permits the citation of the person who first published the hybrid form as such. Example: $\frac{\textit{Bernicla canadensis}}{\textit{Anser cygnoides}}$ Rabé.

c. The fractional form is also preferable in case one of the parents is itself a hybrid. Example: $\frac{\textit{Tetrao tetrix} \times \textit{Tetrao urogallus}}{\textit{Gallus gallus}}$. In the latter case, however, parentheses may be used. Example: (*Tetrao tetrix* × *Tetrao urogallus*) × *Gallus gallus*.

d. When the parents of the hybrid are not known as such [parents], the hybrid takes provisionally a specific name, the same as if it were a true species, namely, as if it were not a hybrid; but the generic name is preceded by the sign of multiplication. Example: × *Coregonus dolosus* Fatio.

FORMATION, DERIVATION, AND ORTHOGRAPHY OF ZOOLOGICAL NAMES.

Art. 19. The original orthography of a name is to be preserved unless an error of transcription, a *lapsus calami*, or a typographical error is evident.

Recommendation.—For scientific names it is advisable to use some other type than that used for the text. Example: *Rana esculenta* Linné, 1758, lives in Europe.

Discussion.—The question of emendation of names has been one of the most difficult that has come up for consideration. Some authors, known as "purists," have insisted upon a classical Latin; others have accepted the original orthography of a name, be it good, bad, or indifferent. Names have been published in a form not altogether in accordance with classical rules, and later authors have emended them; unfortunately, the emending authors have not been in accord in regard to the emendations, and a given name may appear in literature in several "corrected" forms. *Agchylostoma*, for instance, has been "emended" six or eight different times, and it is stated that one name has been "corrected" 23 different times. Unfortunately, also, the emendation of names occasionally leads to the rejection of names which might be retained if emendation were not admitted.

Art. 20. In forming names derived from languages in which the Latin alphabet is used, the exact original spelling, including diacritic marks, is to be retained. Examples: *Selysius*, *Lamarckia*, *Köllikeria*, *Mülleria*, *Stålia*, *Kröyeria*, *Ibañezia*, *Möbiusi*, *Medići*, *Czjzeki*, *spitzbergensis*, *islandicus*, *paraguayensis*, *patagonicus*, *barbadensis*, *faröensis*.

Recommendations.—The prefixes *sub* and *pseudo* should be used only with adjectives and substantives, *sub* with Latin words, *pseudo* with Greek words, and they should not be used in combination with proper names. Examples: *subviridis*, *subchelatus*, *Pseudacanthus*, *Pseudophis*, *Pseudomys*. Words like *subwilsoni* and *pseudo-grateloupana* are not recommended.

The terminations *-ides* and *-oides* should be used in combination only with Greek or Latin substantives; they should not be used in combination with proper names.

Geographic and patronymic names from countries which have no recognized orthography or which do not use the Latin alphabet should be transcribed into Latin according to the rules adopted by the Geographic Society of Paris (see Appendix G.)

AUTHOR'S NAME.

Art. 21. The author of a scientific name is that person who first publishes the name in connection with an indication, a definition, or a description, unless it is clear from the contents of the publication that some other person is responsible for said name and its indication, definition, or description.

Discussion.—At first thought this rule appeals to many persons as unjust. Thus Smith & Kilborne described the parasite of Texas fever as *Pyrosoma*, 1893; this name, however, had been used by Péron in 1804 for an entirely different group of animals, hence it was not available as name for the Texas fever organism. Wandolleck (1895), on this account, proposed *Apiosoma* to replace *Pyrosoma*, 1893; this name also was preoccupied, in 1885, for a genus of ciliated protozoa; Patton (1895) proposed *Piroplasma* as a substitute for *Pyrosoma*, 1893. The point is advanced by some authors that *Piroplasma* should be attributed to Smith & Kilborne instead of to Patton, as it was Smith & Kilborne, instead of Patton, who described the parasite.

This argument does not appeal to zoologists. Our position is that Smith & Kilborne are responsible for *Pyrosoma*, 1893, but not for *Apiosoma*, 1895, or *Piroplasma*, 1895, and an author should be quoted only for a name for which he is responsible. The act of naming an animal is not identical with the act of describing an animal. We therefore quote Smith & Kilborne for the acts for which they are responsible, but we do not quote them as authority for acts for which they are not responsible. If the policy were adopted that the person who describes an animal should be quoted in connection with all the names that have been applied to it, we would be led to the peculiar position of attributing 110 or more names to Goeze in connection with the parasite of hydatid disease, although most of these names were not published until years after Goeze's death; further, such quotation might entirely misrepresent an author's views. Zoologists are held responsible for the many typographical errors and variations in spelling of technical names, even when—as is very frequently the case—these errors are due entirely to the printer or to an editor who follows some special rules of editing; this responsibility we bear with equanimity, irritating though these errors may be, but to assume responsibility for a dozen or a score of names which we never even thought of is a position which no zoologist cares to defend.

This point of view lays stress upon holding an author responsible for the names he publishes, rather than upon "giving him credit" for these names.

The chief idea we have in citing the author of a name is to aid in tracing it. If now we cited Smith & Kilborne, instead of Wandolleck, as author of *Apiosoma*, or instead of Patton as author of *Piroplasma*, we might lead our colleagues to search long in writings of Smith & Kilborne for a name which they perhaps never used even in correspondence.

Art. 22. If it is desired to cite the author's name, this should follow the scientific name without interposition of any mark of punctuation; if other citations are desirable (date, *sp. n.*, *emend.*, *sensu stricto*, etc.), these follow after the author's name, but are separated from it by a comma or by parentheses. Examples: *Primates* Linné, 1758, or *Primates* Linné (1758).

Recommendation.—When the name of the author of a scientific name is abbreviated, the writer will do well to conform to the list [a] of abbreviations published by the Zoological Museum of Berlin.

Discussion.—Since authors' names are cited as aids in bibliographic work, it follows that they should not be cited in a manner to render such work more difficult. Thus, if abbreviations are used—their use in connection with authors' names is not to be recommended—an abbreviation should be used which is not ambiguous. "Cob.," for instance, is unfortunately used for both Cobb and Cobbold.

Art. 23. When a species is transferred to another than the original genus or the specific name is combined with any other generic name than that with which it was originally published, the name of the author of the specific name is retained in the notation but placed in parentheses. Examples: *Tænia lata* Linné, 1758, and *Dibothriocephalus latus* (Linné, 1758); *Fasciola hepatica* Linné, 1758, and *Distoma hepaticum* (Linné, 1758).

If it is desired to cite the author of the new combination, his name follows the parentheses. Example: *Limnatis nilotica* (Savigny, 1820) Moquin-Tandon, 1826.

Discussion.—If a species is transferred from one genus to another, the generic name is of course changed, but the old specific name, if valid, is retained. When *Tænia lata* is transferred to *Dibothriocephalus*, we must of course drop *Tænia* (for this species) in favor of *Dibothriocephalus*, but *lata* becomes *latus*. The case is very much like that of a woman named "Mary Jones," who by marrying into the Smith family becomes "Mary Smith."

In all such transfers of species the original author responsible for the specific name is to be cited in parentheses. Thus "*Dibothriocephalus latus* (Linnaeus, 1758) Lühe, 1899," means to the zoologist that Linnaeus, in 1758, described a species under the name *latus, -a, -um*, but not as *Dibothriocephalus latus*; further, that Lühe quoted this species as *Dibothriocephalus latus* in 1899.

Art. 24. When a species is divided, the restricted species to which the original specific name of the primitive species is attributed may receive a notation indicating both the name of the original author and the name of the reviser. Example: *Tænia solium* Linné, partim, Goeze.

Discussion.—As different groups of animals become better known, it is common experience to find that what was once considered to represent a single species may in fact contain several distinct species. In separating these various forms, the original name is retained for one of them. Thus *Tænia solium* Linnaeus, 1758, contained three species, namely, *T. solium*, *T. saginata*, and *T. hydatigena* (*T. marginata*). *T. solium* of to-day therefore represents only a restricted part of *Tænia solium* as known to Linneus, 1758.

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[a] *Liste der Autoren zoologischer Art- und Gattungsnamen zusammengestellt von den Zoologen des Museums für Naturkunde in Berlin.* Berlin, 2 vermehrte Auflage, 8°, 1896.

THE LAW OF PRIORITY.

Art. 25. The valid name of a genus or species can be only that name under which it was first designated on the condition:

a. That this name was published and accompanied by an indication, or a definition, or a description; and

b. That the author has applied the principles of binary nomenclature.

Discussion.—The law of priority is the keystone of nomenclature. Various attempts have been made to introduce substitutes for it, but none have succeeded.

The point is not infrequently raised that not all zoologists favor this law. To this reply may be made that all persons who have studied the subject carefully see in this law the only hope for an international and stable nomenclature. It is especially the systematists, namely, the men who have to deal with tens of thousands of names, who have insisted upon its adoption; that some physiologists and morphologists (who have to deal with a few score, or a few hundred, at most a few thousand names) should oppose this law is not strange, for their field of study has not been in the line in which the necessity for the law has come home to them. But we do not go to a gynecologist to obtain an opinion on the question whether we should wear glasses nor to an alienist in case we have appendicitis. By following the advice of the ophthalmologist in reference to our eyes, and of the surgeon in reference to appendicitis, we cast no reflections upon the ability of men in other specialities, but we go for advice to men who have had particular experience in the particular line in which we wish the advice. In nomenclatural matters, we naturally turn to the systematists, and they are practically unanimous in favor of the law of priority. In accordance with this law we do not inquire which of the 110 or more names for the echinococcus worm is the most euphoneous, the most classical, the most generally used, the easiest to remember, the one of American or of Chinese origin; we simply inquire: Which is the oldest available generic name and the oldest specific name? A combination of these two gives us the correct binomial, regardless of our subjective views on the question. A few practical examples may be of interest in this connection.

Tænia was described in 1758, with four species, as follows:

1. *solium*, which is now divided into
    (*a*) *solium*, for which about 90 names have been used;
    (*b*) *saginata*, for which about 50 names have been used;
    (*c*) *hydatigena*, for which about 40 names have been used.
2. *vulgaris*=same as 3.
3. *lata*, now *Dibothriocephalus latus*, for which about 30 names have been used.
4. *canina*, now *Dipylidium caninum*, for which more than 15 names have been used.

Reduced to the last analysis, the systematists see themselves forced to adopt the oldest available name in any given case, or to leave it to the personal wishes of every author to use any name he prefers. The author who prefers the latter alternative can not, however, consistently criticise an author who "prefers" to use the earliest available name.

Thus, we use *Ascaris*, 1758, in preference to *Fusaria*, 1800; *Tænia saginata*, 1782, in preference to *Tænia mediocanellata*, 1852; *Tænia*, 1758, in preference to *Alyselminthus*, 1800, and *Halysis*, 1803; *Plasmodium malariæ*, 1881, in preference to *Plasmodium golgii*, 1902; etc.

APPLICATION OF THE LAW OF PRIORITY.

Art. 26. The tenth edition of Linné's *Systema naturæ*, 1758, is the work which inaugurated the consistent general application of the binary nomenclature in zoology. The date 1758, therefore, is accepted as the starting point of zoological nomenclature and of the law of priority.

DISCUSSION.—The adoption of the tenth edition of the Systema naturæ has its practical basis, namely, this was the first work in which the binominal system was consistently applied to all known animals, hence all groups in zoology have the same date (1758) as starting point for their nomenclature. Any earlier names used as generic or specific names in that edition take the date of 1758, while earlier names reintroduced into zoology after January 1, 1758, take priority from such date of reintroduction.

Art. 27. The law of priority obtains and consequently the oldest available name is retained:

a. When any part of an animal is named before the animal itself;

b. When the larva is named before the adult;

c. When the two sexes of an animal have been considered as distinct species or even as belonging to distinct genera;

d. When an animal represents a regular succession of dissimilar generations which have been considered as belonging to different species or even to different genera.

DISCUSSION.—Article 27 is of considerable importance in medicine since names of "larval" forms (or alternating generations) as well as names of adults must be considered. Thus, *Echinococcus*, 1801, must take precedence over *Echinococcifer*, 1858, although the former was established upon a "larval" stage, the latter upon a sexually mature stage.

Art. 28. A genus formed by the union of two or more genera or subgenera takes the oldest valid generic or subgeneric name of its components. If the names are of the same date, that selected by the first reviser shall stand.

The same rule obtains when two or more species or subspecies are united to form a single species or subspecies.

Recommendation.—In absence of any previous revision, the establishment of precedence by the following method is recommended:

(*a*) A generic name accompanied by specification of a type has precedence over a name without such specification. If all or none of the genera have types specified, that generic name takes precedence the diagnosis of which is most pertinent.

(*b*) A specific name accompanied by both description and figure stands in preference to one accompanied only by a diagnosis or only by a figure.

(*c*) Other things being equal, that name is to be preferred which stands first in the publication (page precedence).

Discussion.—The genus *Tænia*, 1758, as at present constituted, is composed of a union of the genera *Tænia*, 1758, *Hydatigena*, 1782, *Megocephalos*, 1782, *Vesicaria*, 1788, *Hydatula*, 1790, *Alyselminthus*, 1800, *Halysis*, 1803, *Physchiosoma*, 1809, *Hydatigera*, 1816, *Trachelocampylus*, 1847, *Arynchotænia*, 1850, *Acanthotrias*, 1858, *Tæniarhynchus*, 1858, *Cystotænia*, 1863, and *Neotenia*, 1886; opinion might differ in regard to which name should be used, but by the law of priority and by article 28 *Tænia* is the correct name for the genus which contains *T. solium.*

The species *Tænia saginata*, 1782, as at present constituted, is composed of several forms which were originally described as distinct.

Hymenolepis, 1858, is composed of a union of *Hymenolepis*, 1858, *Diplacanthus*, 1858, *Lepidotrias*, 1858, and *Drepanidotænia*, 1892.

Art. 29. If a genus is divided into two or more restricted genera, its valid name must be retained for one of the restricted genera.

If a type was originally established for said genus, the generic name is retained for the restricted genus containing said type.

Discussion.—A division of a given genus into more restricted genera is a natural result of our advance in anatomical knowledge. Linnæus in 1758 included in *Tænia* species which are now classified in three more restricted genera. Instead of proposing three new names for these more restricted groups the original name is retained for one of them, namely, for the group which contains the type (*T. solium*). *Fasciola*, 1758, is now divided into a large number of genera, but the fact that *Fasciola* as used to-day is not so broad a genus as when used by Linnæus does not constitute sufficient ground for rejecting this name.

The problem presented is almost the same as that of typhoid fever in 1860, when Zenker recognized that a distinct clinical entity (trichinosis) had been included in typhoid. The newly recognized disease is now called trichinosis, but typhoid is still used for a part of the old composite malady.

If a genus has no type species, and if the genus is divided, it not infrequently occurs that different authors apply the original generic name to different subdivisions of the original genus, and confusion in the nomenclature results. But if a type is designated, the original generic name always follows the subdivision containing the type, so that uniformity in the generic nomenclature is ensured.

Art. 30. If the original type of a genus was not indicated, the author who first subdivides the genus may apply the name of the original genus to such restricted genus or subgenus as may be judged advisable, and such assignment is not subject to subsequent change.

In no case, however, can the name of the original genus be transferred to a group containing none of the species originally included in the genus; nor can a species be selected as type which was not originally included in the genus or which the author of the generic name doubtfully referred to it.

RECOMMENDATION.—In selecting a type authors should govern themselves by the following:

(*a*) A genus which contains a species bearing the same name, either as a valid name or as a synonym, takes that species as type.

(*b*) Select as type some species which the original author studied personally, unless it can be definitely shown that he had some other species more particularly in mind.

(*c*) If the original genus has already been divided without designation of type, the type should be restricted by elimination, namely, by successively rejecting all the species which have already been transferred to other genera; the type is then selected from the species which remain.

If the genus contains both exotic and nonexotic species, from the standpoint of the original author, the type is to be selected from the nonexotic species.

(*d*) Select as type the species which is best described, or best figured, or best known.

DISCUSSION.—Every genus should have a single species, known as its "type," to serve as its standard of reference. This "type" should be designated by the author who proposes the genus. Unfortunately, many authors have failed to designate their "types," and because of this error of omission the nomenclature of some groups has become quite involved. In attempting to straighten out the technical names at present it is necessary to designate types for the older genera.

No existing code of nomenclature provides for all cases that arise, so that authors make supplemental rules for themselves. The rules which I personally adopt are the following:

1. RULE.—A genus proposed with a single original species takes that species as type. (Monotypical genera.)

2. RULE.—The type of a genus containing, from the standpoint of the original author, both valid and doubtful species, must never be selected from any species which the original author of the genus clearly designated as a *species inquirenda* at the time of the publication of the generic name.

3. RULE.—When in the original publication of a genus one of the species is definitely designated as type, that species should be accepted as type regardless of any other considerations. (Type by original designation.)

4. RULE.—If, in the original publication of a genus, *typicus* or *typus* is used as a new specific name for one of the species, such use shall be construed as "type by original designation."

4b. Recommendation.—It is well to avoid the introduction of the names *typicus* or *typus* as new names for species or subspecies, since such names are always liable to result in later confusion.

5. Rule.—If a genus, without designated type, contains among its original species one possessing the generic name as its specific or subspecific name, either as valid name or synonym, that species or subspecies becomes ipso facto type of the genus. (Type by absolute tautonymy.)

6. Recommendation.—If a genus, without designated type, contains among its original species one possessing as specific or subspecific name, either as valid name or as synonym, a name which is virtually the same as the generic name, or of the same origin or same meaning, preference should be shown to that species in designating the type, unless such preference is strongly contraindicated by other factors. (Type by virtual tautonymy.)

7. Rule.—In case a generic name without designated type is proposed as a substitute for another generic name, with or without type, the type of either when established becomes ipso facto type of the other.

8. Rule.—If an author proposes a genus, without designating a type, and includes among the original species [i. e., the valid species from his standpoint] the determined type of an earlier genus, such type becomes ipso facto the type of the new genus. (Type by inclusion.)

9. Rule.—If a genus without a designated type contains types of two or more earlier genera, the type of the new genus is to be selected from the contained types (the case being the same as a genus with two or more species, according to the number of types in question), unless it can be shown that such procedure is directly contraindicated by the original author's intentions.

10. Rule.—If an author, in publishing a genus with more than one valid species, fails to designate or to indicate its type, any subsequent author may select the type, and such designation is not subject to change. (Type by subsequent designation.)

11. Rule.—Certain biological groups which have been distinctly proposed as collective groups, but not as systematic units of generic rank, may be treated for convenience as if they were genera, but they require no type species. Example: *Agamodistomum*.

12a. Rule.—The following species are excluded from consideration in selecting the types of genera:

(*a*) Species which were not included under the generic name at the time of its original publication.

(*b*) Species which were *species inquirendæ* from the standpoint of the author of the generic name at the time of its publication.

(*c*) Species which the author of the genus doubtfully referred to it.

(*d*) Species which have subsequently been selected to serve as types for other genera, unless this applies to all of the available species, in which case the last species so selected becomes the type of the original genus: or unless the species which the original author took as his type has been transferred, in which case the original author's intentions should be carried out. (Type by elimination.)

12b. Rule.—In case of Linnaean genera select as type the most common or the medicinal species. (Linnaean rule.)

12c. Recommendation.—The following species should be shown preference in selecting the type, unless such procedure is contraindicated by the original author's intentions or by practical considerations:

(*a*) If the genus contains both exotic and nonexotic species from the standpoint of the original author, the type should be selected from the nonexotic species.

(*b*) If some of the original species have later been classified in other genera, but not designated as their types, preference should be shown to the species still remaining in the original genus.

(c) All other things being equal, page precedence should obtain in selecting a type.

(d) Species based upon sexually mature specimens should take precedence over species based upon larval or immature forms.

(e) All other things being equal, show preference to a species which the author of a genus actually studied at or before the time he proposed the genus.

(f) Show preference to a species bearing the name *communis*, *vulgaris*, *medicinalis*, or *officinalis*.

(g) Show preference to the best described, best figured, best known, most easily obtainable species, or of which a type specimen can be obtained.

(h) Show preference to a species which belongs to a group containing as large a number of the species as possible.

(i) In parasitic genera, select if possible a species which occurs in man or in some food animal, or in some very common and widespread host.

Applying these rules to some of the generic names used by physicians, we arrive at the following results:

Genus TÆNIA Linnæus, 1758.

Type, *Tænia solium*. For generic synonymy see subgenera *Tænia* (p. 28) and *Tæniarhynchus* (p. 29).

Subgenus TÆNIA Linnæus, 1758.

1758: *Tænia* Linnæus, 1758a,* 819–820; type by elimination *T. solium*; also designated type by several authors.

1777: *Tænia* Scopoli, 1777, 383; for *Tænia*, hence same type (not accessible, reference taken from Sherborn, 1902, 962).

1782: *Hydatigena* Goeze, 1782a, 42, 192; type by absolute tautonymy *Tænia hydatigena* Pallas, 1766, 413, confined by elimination and inclusion to *Hydra hydatula* Linnæus, 1767, equals *Cysticercus tenuicollis*.

1782: *Megacephalus* Goeze, 1782a, 42; only hence type species *Tænia vesicularis fasciolata*, equals *Cysticercus fasciolaris*.

1782: ? *Pseudoechinorhynchus* Goeze, 1782a, 41, 138–139; ? type *Ps. sp.* Goeze, 1782a, 138–139, equals ? *Cysticercus fasciolaris*.

1786: *Tænia* Werner, 1786, 10, not used in Linnæan sense; refers to *Cysticercus cellulosæ*.

1787: *Vesicaria* Müller, 1787, 19–53, includes *Hydatigena*, *Megacephalus*, *Multiceps*, 1782, and other forms; type by inclusion *Cysticercus tenuicollis*.

1788: *Vesicaria* Schrank, 1788a, 29–32, includes *Hydatigena*, *Megacephalus*, and *Multiceps*, 1782, renamed; type by inclusion and page precedence *V. orbicularis*, equals *Cysticercus tenuicollis*; also type by virtual tautonymy *Hydatigena vesicularis*, equals *Cysticercus tenuicollis*.

1790: *Hydatula* Abildgaard, 1790, 55; type by absolute tautonymy *Hydra hydatula*.

1790: ? *Hæruca* Gmelin, 1790, 3036; only hence type species *Hæruca muris* Gmelin, ? equals *Cysticercus fasciolaris*.

1797: *Hydatis* Blumenbach, 1797, 416 (not accessible); apparently only hence type species *H. finna*, see Sherborn, 1902, 363, and Virey, 1798.

1800: *Alyselminthus* Zeder, 1800a, 171–302; *Tænia* renamed, hence same type.

1800: *Cysticercus* Zeder, 1800a, 102–307; *Hydatigena* renamed, hence same type.

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* The short bibliographic references used in this paper are taken from Stiles & Hassall, Index-Catalogue of Medical and Veterinary Zoology.

1803: *Halysis* Zeder, 1803a, 298–377; *Tænia* and *Alyselminthus* renamed, hence same type.

1805: *Cisticercus* Rudolphi, 1805, 40; for *Cysticercus*, hence same type.

1809: *Finna* Brera, 1809a, 153; type *muscularis*, equals *Cysticercus cellulosæ.*

1809: *Physchiosoma* Brera, 1809a, 130–149; type by inclusion *P. globosum* (Batsch, 1786), equals *Cysticercus tenuicollis.*

1810: *Gozziana* Rudolphi, 1810a, 277; refers to *Cysticercus cellulosæ;* doubtful whether it is used in generic sense.

1816: *Hydatigera* Lamarck, 1816, 153–154; type by inclusion and page precedence, *Cysticercus fasciolaris.*

1825: *Fischiosoma* delle Chiaje, 1825a, 24; for *Physchiosoma* Brera, 1809a.

1847: *Trachelocampylus* Fredault, 1847b, June, 310–311; only hence type species *Cysticercus cellulosæ.*

1850: *Arhynchotænia* Diesing, 1850a, 497–521; type by inclusion *Tænia solium.*

1858: *Acanthotrias* Weinland, 1858, 51, 65, 85; only hence type species and type by absolute tautonymy, *Cysticercus acanthotrias.*

1863: *Cystotænia* Leuckart, 1863, 223; type by inclusion *Tænia solium.*

1886: *Neotenia* Sodero, 1886, Oct., 657; type by inclusion and implication, *Cysticercus cellulosæ.*

1894: *Neotænia* Braun, 1894a, 1085; for *Neotenia*, hence same type.

——?: *Cysticerkus* and *Cystizerkus* of various German authors; for *Cysticercus*, hence same type.

Subgenus TÆNIARHYNCHUS Weinland, 1858.

1823: *Pentastoma* Virey, 1823, 219–220 [not Rudolphi, 1819]; only hence type species *P. coarctata* n. sp. = *Tænia saginata.*

1858: *Tæniarhynchus* Weinland, 1858, 46, 51; only hence type species *Tænia mediocanellata*=*saginata.*

Genus ECHINOCOCCUS Rudolphi, 1801.

1782: *Hydatis* Goeze, 1782a, 192; very doubtful whether this is used in a generic sense.

1801: *Echinococcus* Rudolphi, 1801, 52–53; includes *Tænia multiceps* [type of *Multiceps*, 1782, and *Polycephalus*, 1800] and *Tænia visceralis socialis granulosa* Goeze, 1782, hence it is a deliberate renaming of a genus for which two names were already available, but Rudolphi definitely mentions "die körnigen Blasenwürmer" (namely, *granulosa*) as basis of *Echinococcus*, hence this is the type species; see also Rudolphi, 1802, 204.

1804: *Acephalocystis* Laennec, 1804, 132, 134–135; 1812, 96–123, 130–155, 170–173; type apparently *Echinococcus granulosus*, by inclusion.

1819: *Liococcus* Bremser, 1819a, 249; type *Echinococcus hominis;* genus not adopted by Bremser, 1819a.

1819: *Splanchnococcus* Bremser, 1819a, 249; *Echinococcus* renamed, hence same type.

1821: *Acephalocystus* Laennec of Merat, 1821, 229; for *Acephalocystis*, 1804, hence same type.

1829: *Acephalocistis* Cruveilhier, 1829a, 198; for *Acephalocystis*, 1804, hence same type.

1829: ?? *Acrostoma* Lesauvage, 1829, 433–438; only hence type species, *A. amnii;* probably pathological structure of amnion.

1844: ? *Astoma* Goodsir, 1844d, 282; only hence type species *A. acephalocystis* Goodsir.

1844: ? *Diskostoma* Goodsir in Gairdner, 1844a, 276; only hence type species *D. acephalocystis* Goodsir.

1844?: ? *Sphæridion* Goodsir; not accessible; see Gervais, 1847a, 92.

1858: *Echinococcifer* Weinland, 1858, 52, 61, 85; type *Tænia echinococcus.*

1894: ? *Discostoma* Braun, 1894a, 982; for *Diskostoma* Goodsir, 1844, hence same type.

——?: *Echinokokkus* of various German authors, for *Echinococcus*, hence same type.

Genus MONAS Müller, 1773.

This genus was originally published with the diagnosis: "Vermis inconspicuus, simplicissimus, pellucidus, punctiformis," to contain the three species *Monas termo*, *M. lens*, and *M. mica*. It is needless to say that with the technique of 1773 these species are not described with the minuteness that we expect to find in descriptions published at the present day, and if they are judged from the standards of 1905 instead of 1773, authors will doubtless admit that they may be applied to so many species that it is uncertain just which particular form Müller studied. If, however, this principle were applied generally to zoology and botany, we should be obliged to make a new start in nomenclature every few decades. The proper method to follow in a case of this kind is an historical study of the literature and synonymy, judging the subject from the successive standards as these improved, and accepting as correct the assertions of successive authors that they have recognized the older species, unless we are in a position to prove their assertions incorrect. The result of such a study is that early species are gradually narrowed down to closer limits until they become restricted to forms recognizable on basis of our present standards. In the case at hand the history of the three species in question, so far as literature is at my command, is as follows:

1. *Monas termo* Muller, 1773, 25–26. Ehrenberg, 1830a, 57, 81, etc., 1832c, 57, claims to have recognized this same species, adopting the name *Monas termo* Müller, but later authors (Dujardin, 1841a, 212; Diesing, 1850a, 16, 28) consider Ehrenberg's form distinct. Ehrenberg, 1832c, 70, also mentions a "*Bacterium? termo.*"

Dujardin, 1841a, 212, transferred "*Monas termo* Muller, non Ehrenberg" to *Bacterium* as *Bacterium termo* (Müller) Dujardin, and the species is retained here in Diesing, 1850a, 16.

Migula, 1897, 2, states that *Monas termo* Müller can with some certainty be viewed as belonging to the bacteria; Cohn (1872, 168) accepts *Bacterium termo* (as limited by Dujardin) as one of the two species of the genus *Bacterium*, as emended by him.

2. *Monas lens* Muller, 1773, 26–27. Retained in *Monas* by Dujardin, 1841a, 280; placed in subgenus *Mastichomonas* by Diesing, 1850a, 32. Migula, 1897, 2, thinks this species belongs to the bacteria.

3. *Monas mica* Muller, 1773, 27. Retained in *Eumonas* (typical subgenus of *Monas*) by Diesing, 1850a, 25. This species is thus seen to be type of the genus *Monas*, by elimination, and as limited by Diesing, 1850a.

Genus BACTERIUM Ehrenberg, 1828.

[Not *Bactiria* Fisch., 1811, echinoderm; not *Bacteria* Latreille, 1825, orthopteron; nor *Bacteria* for *Bactiria*, 1811.]

1828 *Bacterium* Ehrenberg in Hemprich & Ehrenberg, 1828; Ehrenberg, 1830a, 58.

The use of *Bactiria*, 1811, and *Bacteria*, 1825, does not necessarily invalidate *Bacterium*, 1828.

The genus *Bacterium* was first proposed by Ehrenberg in a paper presented before the Academy of Science, Berlin, Germany, on January 10, 1828, but this was not published until 1829 or possibly until 1830. In the meantime Hemprich & Ehrenberg's (1828a) Symbolæ physicæ, v. 4, appeared, in which *Bacterium* is also published as a new genus. According to the zoological code, it dates from this (1828) paper, since this is its first publication. The original diagnosis reads as follows:

> *Bacterium*, Novum Genus, Familia *Vibrioniorum.*
>
> Charater Generis: Corpus polygastricum? anenterum? nudum, oblongum, fusiforme aut filiforme, rectum, monomorphum (contractione nunquam dilatatum), parum flexile (nec aperte undatum), transverse in multas parte sponte dividuum.
>
> *B. triloculare* nov. spec.: distincte triloculare s. triarticulatum, subfusiforme, hyalinum. Phytozoa Tab. II. Libyca fig. 6.
>
> Animalculum $\frac{1}{300}$ lineæ longum, corpore tereti. Articuli s. septa interna divisionem instantem multiplicem transversam indicare videntur. Mobile sed pigrum animalculum.
>
> In Oasi Iovis Hammonis Siwæ observatum, præterea nullibi.
>
> Bacterii Generis physiologia hucusque obscura. Cibo colorato ventriculos replere hæ formæ respuunt ideoque ad Polygastrica non nisi dubitanter et interim collocantur.
>
> *Bacterium simplex* vide *Monas simplex.*
>
> ——— *scintillans* vide Monas *scintillans.*

Later in the paper, reference is made to "6 species," but these do not appear to have been named.

In his next paper, Ehrenberg (1829 or 1830a, 15) mentioned briefly *Bacterium triloculare*, *B. simplex*, and *B. scintillans*, but as the two latter species were eliminated by him from *Bacterium* in 1828, *B. triloculare* remains as type of the genus.

In a third paper presented to the Berlin Academy by Ehrenberg on March 4 and 18, and printed on August 13, 1830, Ehrenberg (1830a, 58) again referred to *Bacterium* as a new genus with the following diagnosis:

> Corpore oblongo, fusiformi aut filiformi (tereti aut triquetro nec quadrangulo) aperte undatim non flexili, nec spirali.

He states that there are 11 species in this genus and later in the paper he mentions *Bacterium tremulans*, "*B. monas?*" *B. cylindricum*, *B. deses*, *B. enchelys*, *B. fuscum*, and *B. punctum.*

In a paper presented to the Academy in 1831, Ehrenberg (1832, p. 59) eliminates *B. cylindricum* and *B. deses* to *Monas;* on page 60 *Bacterium simplex* Hemprich & Ehrenberg is given as *Monas simplex*, and *Bacterium scintillans* as *Monas scintillans;* under the genus *Bacterium* he gives the following:

> *Bacterium* E., Gliederstäbchen.
>
> +)deutliche Gliederung.
>
> 1. *B. articulatum* E., Perlenschnur-Gliederstäbchen, Längendurchmesser 1/192'''. Körper farblos, etwas spindelförmig, wenig biegsam, mit mehreren deutlichen Abtheilungen (Spuren der Selbsttheilung). Bewegung zitternd. Berlin.
>
> 2. *B. triloculare* H. & E., dreifächriges Gliederstäbchen, Längendurchm. 1/300'''. Körper etwas spindelförmig, farblos, mit drei Abtheilungen. Afrika.

* * * undeutliche Gliederung. [Here are given four species as doubtful, namely, "*B. ?enchelys* E.," "*B. ?punctum* E.," "*B. ?tremulans* E.," and "*B. ?termo* E."]

In his noted monograph Ehrenberg (1838a, 75–77) again cites *Bacterium*. He states that—

> ganz sicher ist nur eine Art der Gattung. Nur bei *B. triloculare* ist thierische wirkliche Organisation beobachtet, indem sich ein wirbelnder Rüssel erkennen liess. Ausserdem ist körnige Trübung und die Selbsttheilung erkannt. Nur die, freilich sehr kräftige, offenbar freie, Bewegung ist ein allen Formen gemeinsamer thierischer Character. * * * *Bacterium triloculare* ist zuerst in der Oase des Jupiter Ammon in Libyschen Africa, dann auch bei Berlin beobachtet. *B. enchelys* und *punctum* sind bisher nur in Petersburg gesehen.

B. triloculare, the type of the genus, was first found in 1820 in swamp water in Africa. Later (1831) Ehrenberg found a similar form near Berlin, which he published as *B. articulatum*. In 1833 Ehrenberg again found this form in a glass of stagnant water in his room in Berlin, and he considered *B. triloculare* and *B. articulatum* as identical. He further observed a terminal flagellum on the organism ("einen einfachen fadenartigen kurzen Rüssel;") this was one-third to one-half as long as the body; "die Bewegung der Thierchen war zitternd und um die Längsaxe langsam wälzend." As doubtful species, Ehrenberg gives *B. enchelys* and *B. punctum*.

As Ehrenberg, the author of both *Bacterium triloculare* and *B. articulatum*, concluded that these two supposedly distinct forms were in reality specifically identical, this conclusion should be accepted as correct until proved to be incorrect, and as he describes his type as possessing a terminal flagellum, *Bacterium* should be taken to possess this character.

It is unnecessary to follow the genus further, in so far as a determination of the type species is concerned, but it is interesting to note its later history.

Dujardin (1841a, 212–216) retains the genus *Bacterium* with the following diagnosis:

> Corps filiforme, roide, devenant plus ou moins distinctement articulé par suite d'une division spontanée imparfaite. Mouvement vacillant non ondulatoire.

He cites the following species:

> 1. *B. termo* (Müller), with the synonyms *Monas termo* Müller, not Ehrenberg; *Vibrio lineola* Ehrenberg. This was not one of the original species.
> 2. *B. catenula* new species.
> 3. *B. punctum* Ehrenberg, synonyms *Monas punctum?* Müller, *Melanella punctum?* Bory; *Bacterium punctum?* Ehrenberg.
>
> *Bacterium triloculare* or *B. articulatum* and *B.* [illegible]

Diesing (1850a, 14–16) describes *Bacterium* as—

> Corpus motum, loricae destitutum, haud contractile, cylindricum subovatum aut subglobosum, partitione imperfecta transversali, multiplici, transversaliter [illegible] lineare, moniliforme, [illegible], rectum, hyalinum [illegible] * * * Flagellum in [illegible] terminale simplex. Ocellus nullus.

1. *B. triloculare* Hemprich & Ehrenberg; syn. *B. articulatum* Ehrenberg.
2. *B. enchelys* Ehrenberg; sp. inquirenda.
3. *B. punctum* Ehrenberg; sp. inquirenda; syns. *Monas punctum* Müller?; *Melanella monadina* Bory, 1824; *Bacterium punctum* Ehrenberg; *Bacterium? punctum* Ehrenberg, and Dujardin.
4. *Bacterium termo* (Müller) Dujardin; sp. inquirenda; syn. *Monas termo* Müller.

Cohn (1872, 168) in his emended *Bacterium* cites two species, namely: *B. termo* Ehrenberg, 1830, Dujardin, 1841; and *B. lineola* (Müller). As neither of these species was among the original species of the genus (1828), and as Ehrenberg himself, as author of the genus, cited (1832a, 59) "*B.? termo*" with reserve, it will be seen that Cohn has used the genus in a sense not altogether in harmony with its first publication (namely, he eliminated the type of the genus).

Migula (1897, 4) states that *Bacterium triloculare*, *B. enchelys*, and *B. punctum* of Ehrenberg are no longer recognizable. As diagnosis of the genus he (1900, 280) gives the following:

> Kürze oder lange cylindrische Zellen, zuweilen Fäden von nicht unbeträchtlicher Länge bildend, *ohne* Geisseln. Endosporenbildung ist bei vielen Arten bekannt, bei anderen scheint sie vollkommen zu fehlen, bei vielen jedoch dürften sie noch bei passenden Bedingungen nachzuweisen sein.

It will be thus seen that *Bacterium* Ehrenberg as used by Migula is not in harmony with Ehrenberg's description of his type, namely, a flagellated form.

If bacteriologists continue to use *Bacterium* in the sense used by Migula, the question does not concern the zoologists and does not come under the zoological code. Our duty with the genus ceases with the date that *Bacterium* was eliminated from zoology. The zoological code provides, however, that the generic name preserves its nomenclatural status and that we can not use *Bacterium* for any other later genus or supposed genus in zoology. Should the time come that *Bacterium* is transferred again to the protozoa, it should, according to the zoological code, be judged upon the basis of its type, *Bacterium triloculare*.

Species BACTERIUM ARTICULATUM Kern, 1897.

Migula gives *Bacterium articulatum* Kern, 1897, as a valid species of *Bacterium*, but attention may be called to the fact that Ehrenberg, 1832c, 69, reports a *Bacterium articulatum*. Kern's species can not retain this name unless it is claimed that it is identical with Ehrenberg's form, in which case it should be attributed to Ehrenberg. Ehrenberg (1838a) cites *B. articulatum* Ehrenberg as a synonym of *B. triloculare* Hemprich & Ehrenberg.

Genus SPIRILLUM Ehrenberg, 1830.

[Not *Spirilla* Humph., 1797, mollusk; not *Spirillum* Oken, 1815, worm; not *Spirillus* Schlot, 1838, mollusk.]

1830. *Spirillum* Ehrenberg, 1830a, 58; type by absolute tautonymy, *Vibrio spirillum*.

This genus was originally published with the diagnosis, "corpore filiforme rigido spirali," and contained two species, namely:

1. *Spirillum volutans* Ehrenberg, equals *Vibrio spirillum* Müller, renamed.
2. *Spirillum undula* (Müller, 1773), namely, *Vibrio undula*.

Judged from the zoological point of view, *Vibrio spirillum* is the type species by absolute tautonymy, but the zoological name *Spirillum*, 1830, was a stillborn homonym, having been used by Oken, 1815, for a genus of polychæte worms. It is not the function of the zoological code to determine the names in bacteriology, but it is undoubtedly not the most wise or farseeing policy for either zoologists or botanists (including bacteriologists) to accept unnecessarily a generic name for organisms so near the border line when that name is a homonym in either zoology or botany; should further investigations again bring bacteriology into zoology, the generic names would come under the zoological code, and in this case *Spirillum*, 1830, would be rejected. If *Spirillum* is retained in bacteriology, consistency calls for the rejection of the name *Spirillum volutans* Ehrenberg in favor of *Spirillum spirillum* (Müller).

Genus SPIRODISCUS Ehrenberg, 1830a.

[Not *Spirodiscus* Stein, 1850, mollusk.]

Only, hence type species *Spirodiscus fulvus* Ehrenberg, 1830a, 85.

Genus SPIROCHÆTA Ehrenberg, 1834.

[Not *Spirochæta* Sars., 1856, worm.]

1834. *Spirochæta* Ehrenberg, 1834a, 169. Only, hence type species *Spirochæta plicatilis* Ehrenberg, 1834; type locality, Berlin, Germany, in water.

1841. *Spirochæte* Dujardin, 1841a, 225; for *Spirochæta*.

1872. *Spirochæte* Cohn, 1872, 180, for *Spirochæta*.

This genus originally contained only one species; hence there can be no question as to the type. This species figures in literature as *Spirochæta plicatilis*, *Spirillum plicatile*, and *Spirulina plicatilis*. The generic name preoccupies *Spirochæta* Sars., 1856, worm.

Since Ehrenberg described *Spirochæta* several new species have been added to the genus. Should future investigations result in a division of the group the name *Spirochæta* must be preserved for the subdivision containing *S. plicatilis*.

Genus BACILLUS Cohn, 1872.

[Not *Bacillus* Latreille, 1825, orthopteron.]

This genus was proposed by Cohn as a genus of plants, namely, after the bacteria had been eliminated from zoology; accordingly the name is not influenced by the existence of *Bacillus* Latreille, 1825. If, however, later investigations should again transfer this genus to the animals, the name *Bacillus* Cohn should be rejected by zoologists because of *Bacillus* Latreille, 1825.

Cohn's genus originally contained three species, as follows:

1. *Bacillus subtilis* (Ehrenberg, 1833) Cohn, 1872; Cohn records *Vibrio subtilis* Ehrenberg as synonym.
2. *Bacillus anthracis* Cohn, 1872; not examined by Cohn. To *Bacterium* by later authors.
3. *Bacillus ulna* Cohn, 1872; retained in *Bacillus* by Migula.

Cohn (1872, 178) mentions *Vibrio bacillus* in his discussion of *Bacillus*, but it is not clear that he definitely includes *V. bacillus* in the genus. This does not, therefore, appear to be a clear case of type by absolute tautonymy. If this case were ruled upon by page precedence, *Bacillus subtilis* would be the type. If preference were shown to the medicinal species (Linnæan rule) *Bacillus anthracis* would be taken as type. This ruling is, however, contraindicated by two factors, namely: *B. anthracis* was not examined by Cohn, and it has been eliminated from *Bacillus*. It would be better to take a species examined by Cohn and one not since eliminated. Were I ruling on this case as a zoological genus, I should accept *B. subtilis* as type of *Bacillus*.

Art. 31. The division of a species into two or more restricted species is subject to the same rules as the division of a genus. But a specific name which undoubtedly rests upon an error of identification can not be retained for the misdetermined species even if the species in question are afterwards placed in different genera. Example: *Tænia pectinata* Goeze, 1782 = *Cittotænia pectinata* (Goeze), but the species erroneously determined by Zeder, 1800, as "*Tænia pectinata* Goeze" = *Andrya rhopalocephala* (Riehm); the latter species does not take the name *Andrya pectinata* (Zeder).

Discussion.--The species *Tænia solium*, 1758, included both *T. solium* and *T. saginata* of the present day. Bloch (1782a) definitely cited *T. solium* as an armed species; Goeze (1782a) showed that two forms were present, but he fell into error in renaming both species; again the two species were confused, but Virey (1823) named *Pentastoma coarctata* (which corresponds to the unarmed species) as a new form; later authors confined *T. solium* to the armed species. The history of the species calls for the retention of *T. solium* for one of the species, and the name has been quite generally applied to the armed form. Goeze's name *saginata* seems to be the oldest available name for the unarmed form.

The question might be raised as to whether Gmelin's (1790) use of *Tænia cellulosæ* for the larval stage of the armed form should not be accepted as reversing the names, but this point may be met with the statement that Bloch (1782) definitely stated that *Tænia solium* is an armed species.

The synonymy, so far as I have followed it, is as follows:

Species TÆNIA SOLIUM Linnæus, 1758.

STROBILA STAGE.

1758: *Tænia solium* Linnæus, 1758a, 819–820, after elimination of *T. saginata* and *T. marginata*; included: *Tænia* osculis marginalibus solitariis Dubois, 1848a, 13–17, fig. 1; *Tænia* articulata teres Linnæus, 1746, 1267; *Lumbricus latus* Tyson, 1683, pl. 1, pl. 2, figs. 2, 6, 10; *Solium* Andry, lumb., f. 5; Bewerw. thes. 202, t. 202, f. 3; *Vermis cucurbitinus* Plater, 1609, 993; *Lumbricus latus* Coulet. monogr.
1766: *T. cucurbitina* Pallas, 1766, 405–407; not accessible; *T. solium*, 1758, renamed.
1782: *T. cucurbitina* Bloch, 1782a, 20–23; armed form, not available, because of *T. cucurbitina*, 1766, which contained both species.
1782: *T. cucurbitina pellucida* Goeze, 1782a, 42.
1782: *T. cucurbitina, plana, pellucida*, Goeze, 1782a, 278, 282–286, pl. 21, figs. 5, 9, 10.
1782: ? *T. vulgaris* Werner, 1782, 49–54, pl. 2, figs. 47–57; not Linnæus, 1758.
1784: *T. solitaria* Leske, 1784 or 1785, not accessible; see Seeger, 1852, 11, as syn. of *T. solium*.
1786: ? *T. dentata* Batsch, 1786a, 184–187, figs. 110–113 (not Nicolai, 1830); *T. vulgaris* Werner, 1782, renamed.
1790: *T. plana pellucida* Goeze, 1782a, of Gmelin, 1790a, 3065.
1802: *Tænia armata umana* Brera, 1802a, 21–24, pl. 1, figs. 1–3, 6, 8–10, 11.
1803: *Halysis solium* (Linnaeus, 1758a), Zeder, 1803a, 359–361.
1808: *Tænia armata hominis* Brera, 1808a, 64–80, pl. 1, figs. 1–14, 17–22.
1810: *T. humana armata* Rudolphi, 1810a, 161; in synonymy.
1833: ? *T. fenestrata* Chiaje, 1833a, 20, pl. 3, fig. 2.
1852: *T. solium* Linnaeus, 1758, partim Küchenmeister, 1852f, 101–103.
1855: *T.* [illegible] Küchenmeister, 1855a, 64; *T. solium* Linnæus, 1758a, partim Küchenmeister, 1852, renamed.
1861: *T.* [illegible] Kaberlé, 1861a, 329, based on *Cysticercus* [illegible].
1861: *T. melanocephala* Kaberlé, 1861a, 329, based on *Cysticercus melanocephalus*.
1861: *Tænia solium* (Linnæus, 1758) Beneden, 1861a, 144–146.
1861: *T. cucurbitina* Goeze of Beneden, 1861a, 144, in synonymy.
1863: *Tænia [(Cysticercus)] solium* Linnæus of Leuckart, 1863, 223, 225.
1863: *T. (Cysticercus) acanthotrias* (Weinland, 1858) Leuckart, 1863, 310–312, figs. 86–87.
1874: *T. tenella* Cobbold, 1874b, 888 (not Pallas, 1781).
1876: *T. solium fenestrata* Colin, 1876a, 876, 874, fig. 1; Maggiora, 1891, 147.
1888: *T. solium minor* Guzzardi & Asmundo, 1888a, 577–582, figs. 1–15.
1888: *Tænia tenella* (Cobbold, 1874) Guzzardi & Asmundo, 1888a, 579–580.
1892: *Tænia* [illegible] 1892, 673–675; *T. solium fenestrata* Colin, renamed.
1899: *T. solium* [illegible] 1899, 970, same as *T. acanthotrias*.
1904: *T.* [illegible] 1904a, 361, fig. 150, for *Tænia solium*.
1904: *T.* [illegible] 1904, 872; misprint for *T. tenella* Cobbold, 1874b.

CYSTIC STAGE.

1783: *Vesicaria lobata* Fabricius, 1783, 287–295, figs. 1–5; see Diesing, 1850a, 486.
1786: *Finna* Werner, 1786, 10; not in generic sense.
1786: *Finna humana* Fischer in Werner & Fischer, 1786, 50, pl. 1, figs. 1–8; in man; not binomial.
1788: *Tænia hydatigena* Fischer, 1788b, 65–77, pl. 5, figs. 1–9; in carne suis; not consistently binomial.
1789: *T. hydatigena* Fischer, 1789a, 25; in man; not binomial.
1789: *Hydatis piriformis* Fischer, 1789a, 42, figs. 1–5; not as binomial.
1790: *Tænia cellulosæ* Gmelin, 1790a, 3059; based on Werner, 1786, 10, pl. 1, figs. 1–8; in man.
1790: *T. finna* Gmelin, 1790a, 3063–3064; based on Fischer, 1788b, 65, pl. 5; in hogs.
1793: *Vesicaria hygroma humana* Schrank, 1793, 137; not accessible; see Diesing, 1850a, 486.
1793: *V. finna suilla* Schrank, 1793, 137; not accessible; see Diesing, 1850a, 486.
1793: *Tænia albopunctata* Treutler, 1793, 1–9, pl. 2, figs. 1–2; in man; Jördens, 1802a, 61–62, pl. 6, figs. 1–2; Lænnec, 1804, and 1812, 69–75.
1793: *T. pyriformis* Treutler, 1793, 8.
1797: *Hydatis finna* (Gmelin, 1790) Blumenbach, 1797, 415; not accessible; 1816a, 12–13.
1798: *H. cellulosæ* (Gmelin, 1790a) Virey, 1798, 435.
——?: *H. humana* Blumenbach, —?—; not accessible; see delle Chiaje, 1825a, 24–25.
1802: *Tænia muscularis* Jördens, 1802a, 57–59, pl. 5, figs. 12–16; *Finna humana* Fischer, 1786, named binomially.
1802: *T. piriformis* Jördens, 1802a, 59–61, pl. 5, figs. 17–21; *Tænia hydatigena* Fischer, 1789a, p. 25, figs. 1–5, renamed.
1802: *T. hydatigena anomala* Steinbuch, 1802; not accessible; see Diesing, 1850a, 486.
1803: *T. collulosa* Treutler of Zeder, 1803a, 407; in synonymy.
1803: *Cysticercus albopunctatus* (Treutler, 1793) Zeder, 1803a, 421.
1803: *C. pyriformis* (Treutler, 1793) Zeder, 1803a, 414.
1803: *C. finna* (Gmelin, 1790a) Zeder, 1803a, 407–409.
1804: *C. finnus* (Gmelin, 1790a) Lænnec, 1804, 133; 1812, 46–57, 158.
1804: *C. dicystus* Lænnec, 1804, 133, n. sp., in man; 1812, 61–69, 162.
1804: *C. fischerianus* Lænnec, 1804, 133; 1812, 57–61, 161; *Hydatis piriformis* Fischer, 1789, renamed.
1805: *Cisticercus finna* (Gmelin, 1790a) Rudolphi, 1805, v. 2, 40.
1808: *Cysticercus cellulosæ* (Gmelin, 1790a) Rudolphi, 1808a, 116–118.
1809: *Fischiosoma pyriforme* (Treutler, 1793) Brera, 1809a, 138; probably not intended for Latin; see *Physchiosoma pyriforme.*
1809: *Physchiosoma pyriforme* (Treutler, 1793) Brera, 1809a, 138–140.
1809: "*Finna cisticercus* Zeder" of Brera, 1809a, 154; in synonymy.
1809: *Finna muscularis* (Jördens, 1802) Brera, 1809a, 153–159, pl. 2, figs. 11–13; pl. 3, figs. 6–10.
1810: ? *Cysticercus canis* Rudolphi, 1810a, 234–235; Kœberlé, 1861a, 183.
1812: *Tænia cellulosa* (Gmelin, 1790a) Lænnec, 1812, 158, in synonymy.
1816: *H. finna* (Gmelin, 1790a) Blumenbach, 1816a, 12; probably 1807a; from swine; 1825a, 243; 1827a, 1 pl., 2 figs.
1816: *C. cellulosœ* Lamarck, 1816, 154; for *C. cellulosæ.*
1816: *Hydatigera cellulosœ* Lamarck, 1816, 154.
1825: *Tænia hydatigena suilla* Fischer of delle Chiaje, 1825a, 24–25; in synonymy.
1825: *Cysticercus cellulosa* (Gmelin, 1790) Cuvier, 1825a, 90.
1825: *Vesicaria finna* Schrank (not accessible) of delle Chiaje, 1825a, 24–25.
1825: *V. hygrometra* Schrank (not accessible) of delle Chiaje, 1825a, 24–25.

1825: "*Finna cysticercus* Zeder" of delle Chiaje, 1825a, 24, in synonymy.
1825: *Hydatis lanceolata* Lam. (not accessible) of delle Chiaje, 1825a, 24–25.
1837: *Tænia albopuoctata* Tschudi, 1837, 54; misprint for *albopunctata*.
1840: ? *T. hydatigena* in letter to Creplin, 1840a, 150.
1847: *Trachelocampylus* Fredault, 1847b, June, 310–311.
1850: *Tænia albopunctata hominis* Treutler of Diesing, 1850a, 486; in synonymy.
1850: *Vesicaria lobata suilla* Fabricius, 1783, of Diesing, 1850a, 486; in synonymy.
1850: *Vermis vesicularis* Brera of Diesing, 1850a, 486; in synonymy.
1850: *Cysticercus cellulosa* (Gmelin, 1790) Diesing, 1850a, 486–488.
1850: ? *C. vesicæ hominis* Creplin, 1840, of Diesing, 1850a, 492.
1850: *Hydatigena cellulosa* Lamarck of Diesing, 1850a, 487; in synonymy.
1850: *Tænia cellulosa* Gmelin of Diesing, 1850a, 486; in synonymy.
1858: *Acanthotrias* Weinland, 1858, 51, 65, 85; type *C. acanthotrias*.
1858: *Cysticercus acanthotrias* Weinland, 1858, 64, 67, 85, figs. 11–12; n. sp., in man.
1860: ? *C. vesicæ* Creplin, 1840, of Moquin-Tandon, 1860, 369.
1861: *Tænia hydatigena eremita* Werner of Kœberlé, 1861a, 183; in man.
1861: *T. hydatigena* Kœberlé, 1861a, 183; of pork.
1861: *Cysticercus solium* (Linnæus, 1758a) Kœberlé, 1861a, 183, 328, 329, 334.
1861: *C. turbinatus* Kœberlé, 1861a, 219, 263–264, 334; includes trachélocampyle.
1861: *C. melanocephalus* Kœberlé, 1861a, 183, 264–265, 328, 329, 334, pl. 2, fig. 1; n. sp., in man.
——?: *C. multilocularis* Küchenmeister; not accessible.
1869: *C. suis* Cobbold, 1869a, 30; *C. cellulosæ*, renamed.
1874: *C. racemosus* Heller, 1874a, 334; in brain of man.
1874: *C. botryoides* Heller, 1874a, 334 (not Reinitz, 1885); =*C. racemosus*.
1886: *Neotenia* Sodero, 1886, 650–662, figs. 1–10; *C. cellulosæ*, renamed.
1894: *Neotænia* Braun, 1894a, 1085; for *Neotenia* Sodero, 1886.
1896: *Cysticerkus cellulosa* (Gmelin, 1790a) Schneidemühl, 1896, 274, 275, 276–277; for *Cysticercus cellulosa*.
1898: *Tænia hydatigera* Fischer, 1788, of Stiles, 1898, 89; misprint for *T. hydatigena*.

Species TÆNIA SAGINATA Goeze, 1782.

STROBILA STAGE.

1758: *Tænia solium* Linnæus, 1758a, 819–820, pro parte.
1766: *T. cucurbitina* Pallas, 1766, 405–407, pro parte; not accessible.
1782: *T. cucurbitina saginata* Goeze, 1782a, 42.
1782: *T. cucurbitina grandis saginata* Goeze, 1782a, 278.
1782: ?*T. vulgaris* Werner, 1782, 49–54, pl. 3, figs. 47–57.
1785: ?*T. solitaria* Leske, 1785, pro parte; not accessible.
1786: ?*T. dentata* Batsch, 1786a, 184–187, figs. 110–113; *T. vulgaris* Werner, 1782, renamed.
1790: *T. grandis* Gmelin, 1790a, 3065; in synonymy.
1803: *Halysis solium* (Linnæus, 1758a) Zeder, 1803a, 359–361, pro parte.
1823: [illegible] Virey, 1823, 219–220.
1830: *Tænia dentata* Nicolai, 1830, 161 (not Batsch, 1786), not accessible; see Diesing, 1863a, 366.
1833: ?*T.* [illegible] delle Chiaje, 1833a, 20, pl. 3, fig. 2, based on de Cazeles, 1768a, 26–43.
1847: *T. lata* Pruner, 1847, 245–246, not Linnæus, 1758a; see Diesing, 1863a, 367, and Blanchard, 1886a, 315.
1847: *T. tenella* Pruner, 1847, 245, not Pallas, 1781; see Diesing, 1853a, 369.

1847: *Bothriocephalus tropicus* Schmidtmüller, 1847, 602–603.
1852: *Tænia mediocanellata* Küchenmeister, 1852f, 101–103.
1852: *T. mediocanellata hominis* Küchenmeister, 1852f, 101–103.
1852: *T. zittaviensis* Küchenmeister, 1852f, 101–103.
1854: *T. solium mediocanellata* Diesing, 1854b; 1854c, p. 51.
1855: *T.* vom Cap der guten Hoffnung Küchenmeister, 1855a, 93–95.
1858: *T.* [*Tæniarhynchus*] *mediocanellata* Küchenmeister of Weinland, 1858, 46, 51.
1858: *T. solium abietina* Weinland, 1858, 43–45, 84.
1860: *T. inermis* Moquin-Tandon, 1860, 359, 425; Laboulbène, 1876, 189; not Brera, 1803a.
1860: *T. tropica* (Schmidtmüller, 1847) Moquin-Tandon, 1860, 360.
1860: "*T. mediocancellata* of several authors," Moquin-Tandon, 1860, 359.
1860: *T. capensis* Moquin-Tandon, 1860, 359.
1861: *Tæniarhynchus mediocanellatus* (Küchenmeister, 1852) Weinland, 1861, 18; see Diesing, 1863a, 368.
1861: *Tænia megaloon* Weinland, 1861, 118–120, figs.; not accessible.
1863: *T.* [(*Cystotænia*)] *mediocanellata* Küchenmeister of Leuckart, 1863, 285.
1866: *T. lophosoma* Cobbold, 1866p, 438–439; 1866, 52–54.
1867: *T. saginata* Goeze of Leuckart, 1867, 284.
1873: *T. abietina* Weinland, 1858, of Davaine, 1873a, 572.
1876: ? *T. fusa* Colin, 1876a, 323.
1876: ? *T. continua* Colin, 1876a, 323, fig. 2.
1876: ? *T. solium fusa* Colin, 1876a, 324, fig. 2.
1876: ? *T. solium continua* Colin, 1876a, 324, fig. 2.
1877: *T. nigra* Davaine, 1877a, 1000; based upon Laboulbène's observation.
1883: *T. algérien* Redon, 1883, 182, 183.
1885: *Tenia abietina* (Weinland) Guzzardi Asmundo, 1885a, 580.
1885: *T. mediocanellata* (Küchenmeister) Guzzardi Asmundo, 1885a, 580.
1885: *Tænia mummificata* Guzzardi Asmundo, 1885a, 579 ["saginata or solium"].
1885: *Tenia cosidetta mummificata* Guzzardi Asmundo, 1885a, 579 [solium or saginata].
1886: *Tænia saginata abietina* Weinland of Leuckart (Hoyle), 1886, 479, fig. 272.
1886: *Tenia seghettata* Bergonzini, 1886a, 309; not as Latin name.
1891: *Tænia inermis fenestrata* Maggiora, 1891, 145–151.
1891: *T. perforata* Maggiora, 1891, 147; based on Leuckart, 1880, 579, fig. 263.
1894: *T. algeriana* Pepper, 1894, 871; for *T. algérien* Redon, 1883.
1894: *T. algeriensis* Braun, 1894a, 1074; for *T. algérien* Redon, 1883.

CYSTIC STAGE.

1863: *Cysticercus tæniæ mediocanellatæ* Leuckart, 1863, 408.
1866: *C. bovis* Cobbold, 1866a, 77; 1866r, 462.
1877: *C. inermis* Davaine, 1877a, xliv.
1880: *C. tæniæ saginatæ* Leuckart, 1880, 586; probably earlier.
1896: *Cysticerkus bovis* (Cobbold, 1866) Schneidemühl, 1896, 278.
1896: *C. tæniæ saginatæ* (Leuckart) Schneidemühl, 1896, 278–279.

Genus DIPYLIDIUM Leuckart, 1863.

1863: *Dipylidium* Leuckart, 1863, 400; type *Tænia "elliptica"* Batsch = *canina* Linnæus, 1758.
1858: *Alyselminthus* Weinland, 1858, 53; type *T. cucumerina* = *T. canina* Linnæus, 1758; [not *Alyselminthus* Zeder, 1800 = *Tænia*, renamed, hence type *T. solium.*]
1882: *Cercocystis* Villot, 1882, 8–9; type *Cercocystis trichodectis* equals *Dipylidium caninum.*
1884: *Microtænia* Sedgwick, 1884, 336; type by inclusion, *Dipylidium caninum.*

Species DIPYLIDIUM CANINUM (Linnæus, 1758).

STROBILA STAGE.

1758: *Tænia canina* Linnæus, 1758a, 820; included: *Tænia* osculis marginalibus oppositis Dubois, 1748a, 20–21, fig. 4; Ruysch., obs. 84; Act. Stockh. 1747, t. 5, f. a.

1781: *T. moniliformis* Pallas, 1781; not accessible; not Batsch, 1786.

1782: *T. cucumerina* Bloch, 1782a, 17, pl. 5, figs. 6–7; from dog, with *T. canina* Linnæus as possible synonym.

1782: *T. cateniformis* Goeze, 1782a, 42, 306–337 [includes *T. canina* Linn. as synonym, and also other forms; is best construed as a renaming of *T. canina*, 1758.]

1782: *T. elliptica* Goeze, 1782a, 312, equals *T. canina* Linnæus, 1758, renamed.

1786: *T. ellyptica* Batsch, 1786a, 129–133, figs. 7, 8, 24–26, 57, 65, 121; for *T. canina* Linnæus, 1758, and *T. elliptica* Goeze, 1782; [dog and cat].

1788: *T. moniliformis* Schrank, 1788a, 34 [not Batsch, 1786]; based on Goeze 1782a, pl. 22b, figs. 13–22 [from cat].

1790: *T. cateniformis canina* Linnæus, 1758, in Gmelin, 1790a, 3066.

1790: *T. cateniformis felis* Gmelin, 1790a, 3067; based on Goeze, 1782a, 315, pl. 22b, figs. 13–22; from cats.

1800: *Alyselminthus ellypticus* (Batsch, 1786a) Zeder, 1800a, 290.

1803: *Halysis ellyptica* (Batsch, 1786a) Zeder, 1803c, 361–363.

1861: *Tenia canina* Beneden, 1861a, 157–158, pl. 21, figs. 1–14.

1861: *T. cucumerina* (Bloch, 1782a) Beneden, 1861a, 157; in synonymy.

1863: *Tænia* [*Dipylidium*] *cucumerina* of Leuckart, 1863, 400.

1882: *Cryptocystis trichodectis* Villot, 1882, 8–9.

1893: *Dipylidium caninum* (Linnæus, 1758a) Railliet, 1893a, 284–290, figs. 181–189.

Genus DIBOTHRIOCEPHALUS Lühe, 1899.

Species DIBOTHRIOCEPHALUS LATUS (Linnæus, 1758) Lühe, 1899.

1758a: *Tænia lata* Linnæus, 1758a, 820, to include: *Tænia* osculis lateralibus solitariis Dubois, 1748a, 19–20, fig. 3.

1758: *T. vulgaris* Linnæus, 1758a, 820, to include: *Tænia* osculis lateralibus geminis Dubois, 1748a, 17–18, fig. 2; *Tænia* articulata plana Linnæus, 1746a, 363; *Lumbricus latus s. intestinorum* Plater, 1609, 992; "*Tænia* Schenk. obs. 111, p. 408;" "*Lumbricus latus* Spigel. monogr.;" "Barthol. act. 1673, p. 148, t. 39;" "*Tænia vulgaris* Andry lumbr. t. 9" [but fig. 23, pl. 9, of Andry, 1718a, is clearly a *Tænia* s. str.]; "*Tænia* Bewerw. thes. 202, t. 202, f.;" "Gadd. satagund., 88."

1766: *T. grysea* Pallas, 1766, 408; not accessible.

1781: *T. membranacea* Pallas, 1781, 59, pl. 3, figs. 13–16; not accessible.

1781: *T. tenella* Pallas, 1781, 69; not accessible.

1782: *T. lata humana* Bloch, 1782a, 17–18.

1789: *T. vulgaris vel grisea vel membranacea* Fischer, 1789a, 14.

1789: *T. lata vel caudata* Fischer, 1789a, 14.

1789: *T. tenella* Fischer, 1789a, 14 [T. osculis lateralibus solitariis].

1790: *T. vulgaris* Gmelin, 1790a, 3065–3066.

1802: *Tenia inerme umana* Brera, 1802a, 24–26, pl. 1, figs. 4, 5, 7, 9; in part.

1802: *Tænia inermis* [illegible] Brera, 1802a, 31, not Moquin Tandon, 1860.

1803: *Halysis lata* (Linnæus, 1758) Zeder, 1803a, 357–358.

1803: *H. membranacea* (Pallas, 1781) Zeder, 1803a, 358–359.

1810: *Tænia humana inermis* Rudolphi, 1810a, 71; in synonymy.

1816: *Bothriocephalus hominis* Lamarck, 1816, 167.

1819: *Bothriocephalus latus* (Linnæus, 1758a) Bremser, 1819a, 88–96, pl. 2, figs. 1–12.
1850: *Dibothrium latum* (Linnæus, 1758a) Diesing, 1850a, 585–586.
1873: *Bothriocephalus cristatus* Davaine, 1873a, 589–591, fig. 12.
1876: *Tænia fenestrata* Colin, 1876a, 321.
1880: *Botriocephalus vulgaris cristatus* (Davaine, 1873a) Grassi, 1880a, 42.
1880: *B. vulgaris latus* (Linnæus, 1758a) Grassi, 1880a, 42.
1880: *B. vulgaris tenellus* (Pallas, 1781) Grassi, 1880a, 42.
1880: *B. tenellus* (Pallas, 1781) Grassi, 1880a, 34, 42.
1885: *Bothriocephalus latus tenellus* (Pallas, 1781) Guzzardi Asmundo, 1885a, 582.
1886: *B. latissimus* Burgnion, 1886; not accessible.
1886: *B. dorpatensis* Thoma in Küchenmeister, 1886c, 552.
1886: *B. balticus* Thoma in Küchenmeister, 1886c, 552.
1891: *Bothriocephalus latus fenestr*[*atus*] Maggiora, 1891, 148.
1891: *B. fenestratus* Maggiora, 1891, 149.
1899: *Dibothriocephalus latus* (Linnæus, 1758a) Lühe, 1899, 47.
1899: *D. cristatus* (Davaine, 1873) Lühe, 1899, 47.

Genus ECHINOCOCCUS Rudolphi, 1801.

Species ECHINOCOCCUS GRANULOSUS (Batsch, 1786).

This species has a very complicated synonymy.

STROBILA STAGE.

1808: *Tænia cateniformis* of Rudolphi, 1808a, 411; misdetermined.
1850: *T. cucumerina* Bloch of Diesing, 1850a, 532; in part only, cf. Rudolphi.
1852: *T. serrata* [young] of Röll, 1852, 52, figs. 1–2; misdetermined.
1853: *T. echinococcus* Siebold, 1853, Apr. 18, 423–424, pl. 16a, figs. 1–9.
1853: *T. serrata juvenalis röllii* Küchenmeister, 1853, 80.
1858: *Echinococcifer* Weinland, 1858, 52; type *Tænia echinococcus.*
1861: *Tenia nana* van Beneden, 1861a, 158–159, pl. 21, figs. 15–20.
1861: *Echinococcifer echinococcus* (Siebold, 1853) Weinland, 1861, 19; not accessible.
1861: *Tænia echinococca* of Kœberlé, 1861a, 329.
1863: *T.* [(*Echinococcifer*)] *echinococcus* of Leuckart, 1863, 335–389.
1864: *T.* [(*Arhynchotænia*)] *echinococcus* of Diesing, 1864a, 395.
1864: *T. nana* (Beneden, 1861a) Diesing, 1864a, 395; not Siebold, 1852.
1864: *Tænia serrata röllii* Küchenmeister of Diesing, 1864a, 395.
1878: *T. echinoccus* Linstow, 1878, 5; misprint.
1886: *T.* [(*Echinococcus*)] *echinococcus* of Railliet, 1886, pp. 247–252.

CYSTIC STAGE.

(*a*) Names based upon the granulose form, found more frequently in ruminants:
1782: *Tænia visceralis socialis granulosa* Goeze, 1782a, 42, 192, 258–264, pl. 20b, figs. 9–14; from sheep and calves.
1786: *Hydatigena granulosa* Batsch, 1786a, 87–89, figs. 17, 37.
1788: *Vesicaria granulosa* (Batsch, 1786a) Schrank, 1788, 31.
1788: *Tænia visceralis granulosa* Goeze of Schrank, 1788, 31, and Zeder, 1800a, 305.
1790: *T. granulosa* (Batsch, 1786a) Gmelin, 1790a, 3062–3063.
1803: *Polycephalus granulosus* (Batsch, 1786a) Zeder, 1803a, 431–432.
1805: *Echinococcus granulosus* (Batsch, 1786a) Rudolphi, 1805, 41, and Leuckart, 1863, 364.
1805: *Tænia hydatigena granulosa* Rudolphi, 1805, 41; in synonymy.
1810: *Echinococcus veterinorum* Rudolphi, 1810a, 251–253, pl. 11, figs. 5–7; *Hydatigena granulosa* Batsch, 1786a, renamed.

1812: *Polycephalus granosus* Lænnec, 1812, 169; *P. granulosus*, renamed.
1812: *Tænia granosa* Gmelin of Lænnec, 1812, 169; in synonymy.
1812: *T. visceralis socialis granosa* Goeze of Lænnec, 1812, 169; in synonymy.
1819: *Splanchnococcus echinatus* Bremser, 1819a, 249; *E. veterinorum*, renamed.
1850: *Tænia visceralis socialis granulosa* Goeze of Diesing, 1850a, 482; in synonymy.
1855: *Echinococcus scolecipariens* Küchenmeister, 1855a, 140, pl. 3, figs. 17a–d; pl. 4, figs. 1–9, viii; *E. veterinorum*, renamed.
1855: *E. cœnuroides* Küchenmeister, 1855a, 139; *E. veterinorum*, renamed.
1855: *Tænia echinococcus scolecipariens* Küchenmeister, 1855a, x; *E. veterinorum*, renamed.
1866: *Echinococcus simplex* Leuckart, 1866, 779; *E. scolecipariens*, renamed.
1866: *E. exogena* (Kuhn, 1830) R. Blanchard, 1886a 433.
1898: *E. scoliciparienss* Küchenmeister of Stiles, 1898, 113; misprint.
(*b*) Names based upon the variation found more commonly in man:
1800: *Polycephalus hominis* Zeder, 1800a, 309–316, pl. 2, figs. 5–7.
1803: *P. humanus* Zeder, 1803a, 431, pl. 4, figs. 7–8; *P. hominis*, renamed.
1803: *P. echinococcus* Zeder, 1803a, 432; *P. hominis*, renamed.
1810: *Echinococcus hominis* (Zeder, 1800a) Rudolphi, 1810a, 247–250, pl. 9, fig. 4.
1819: *Liococcus* Bremser, 1819a, 249; *E. hominis*.
1819: *Splanchnococcus lævis* Bremser, 1819a, 249; *E. hominis*, renamed.
1855: *Echinococcus altricipariens* Küchenmeister, 1855a, 133, 152–166, pl. 3, figs. 18a–19; pl. 4, figs. 10a–e; *E. hominis*, renamed.
1861: *Cysticercus echinococcus* (Zeder, 1803a) Kœberlé, 1861a, 183, 328, 334.
1863: *Echinococcus hydatidosus* Leuckart, 1863, 365; *E. altricipariens*, renamed.
1863: *E. endogena* (Kuhn, 1830) Leuckart, 1863, 365; for *E. altricipariens*.
(*c*) Names based upon so-called acephalocysts:
1804: *Acephalocystis* Lænnec, 1804, 132, 134–135 (no specific names mentioned); 1812, 96–123, 130–155, 170–173.
1808: *A. humana* Ludersen; not accessible; see Tschudi, 1837, 35.
1808: *A. solida* Ludersen; not accessible; see Tschudi, 1837, 36.
1812: *A. ovoidea* Lænnec, 1812, 171.
1812: *A. cystifera* Lænnec, 1812, 171.
1812: *A. [illegible]* Lænnec, 1812, 172.
1812: *A. [illegible]* Lænnec, 1812, 172.
1812: *A. surculigera* Lænnec, 1812, 172.
1812: *A. granosa* Lænnec, 1812, 172.
[1812: *A. plana* Lænnec, 1812, 172–173, is a spurious parasite, albuminous concretions occasionally found in the wrist, afterwards described by Dupuytren as *[illegible] carpi*.]
1821: *Acephalocystis communis* Merat, 1821, 229.
1825: *Acephalocystis communis* Lænnec, 1825, 32.
1829: *A. eremita* Cruveilhier, 1829a, 198, the most frequent in animals.
1829: *A. sterilis* Cruveilhier, 1829a, 198, same as *A. eremita*.
1829: *A. socialis* Cruveilhier, 1829a, 198.
1829: *A. prolifera* Cruveilhier, 1829a, 198; same as *A. socialis*.
1829: *Acephalocystis [illegible]* Cruveilhier, 1829a, 198.
1829: *A. prolifera* Cruveilhier, 1829a, 198.
1830: *Acephalocystis endogena* Kuhn, 1830, not accessible; 1832, 890, in man; *A. socialis vel prolifera*, renamed.
1830: *A. exogena* Kuhn, 1830, not accessible; 1832, 890, in animals; *A. eremita vel sterilis*, renamed.
1833: *A. granulosa* delle Chiaje, 1833a, 32, for *A. granosa* Lænnec, 1804.
1833: *A. eremita sterilis* Cruveilhier of delle Chiaje, 1833a, 33.
1833: *A. prolifera socialis* Cruveilhier of delle Chiaje, 1833a, 33.

1844: *A. simplex* Goodsir, 1844d, 282.
1861: "*Acephalocystis macaci?*" Cobbold, 1861e, 120.
1861: ?*A. ovis tragelaphi* Cobbold, 1861e, 120; "probably an aborted coenurus."
(*d*) Names based upon names of animals in which the parasite occurs:
1800: *Polycephalus hominis* Zeder, 1800a, 309–316, pl. 2, figs. 5–7.
1803: *P. humanus* Zeder, 1803a, 431; *P. hominis*, renamed.
1808: *Acephalocystis humana* Lüdersen, 1808; not accessible.
1808: *A. suilla* Lüdersen, 1808; not accessible.
1810: *Echinococcus hominis* (Zeder, 1800a) Rudolphi, 1810a, 247–250.
1810: *E. simiæ* Rudolphi, 1810a, 250–251; *Hydatis erratica* Blumenbach, 1805, renamed.
1815: *E. simiæ cynomolgi* Oken, 1815, 142.
1847: *E. girafæ* Gervais, 1847a, 100–102.
1850: *E. giraffæ* Gervais of Diesing, 1850a, 483.
——?: *E. suis;* not traced.
1848: *E. arietis* E. Blanchard, 1848; not accessible at present.
1852: *E. pardi* Huxley; not traced.
1861: "*Acephalocystis macaci?*" Cobbold, 1861e, 120.
1861: ?*A. ovis tragelaphi* Cobbold, 1861e, 120; "probably an aborted coenurus."
(*e*) Names based upon names of organs in which the parasite occurs:
1862: *Echinococcus cerebri* Spiering, 1862, 13; not accessible.
1862: *E. hepatis* Scholler, 1862, 14, not accessible; Kehlberg, 1873.
1862: *E. process. vermiformis* Scholler, 1862, 14; not accessible.
1867: *E. lienis* Ber. Krankenanst. Rudolf-Stiftung, Wien, 1867, 237; Kehlberg, 1873a.
1875: *E. pulmonum* Huppert, 1875a.
1880: *E. intracranialis* Fricke, 1880a, 5.
1886: *E. retroperitonealis* Bitter, 1886a.
1891: *E. mesenterii* Surmann, 1891.
1895: *E. subdiaphragmalis-præperitonealis* Krasnoff, 1895a, 852–863.
1896: *E. subphrenicus* Huber, 1896a, 527.
1898: *E. intercranialis* Fricke of Stiles, 1898, 113; misprint.
1898: *E. retroperitonialis* Bitter, 1886, of Stiles, 1898, 113; misprint.
——?: "*E. cerebralis* Perroncito," not accessible; possibly based upon "Echinococchi cerebrali" Perroncito, 1882, 172.
(*f*) General names, proposed to include several or all variations:
1827: *Echinococcus infusorium* F. S. Leuckart, 1827, 15.
1837: *Polycephalus volvox* Tschudi, 1837, 31.
1837: *P. echinococcus* Tschudi, 1837, 26–27, 38–45.
1837: ? *E. variabilis* Siebold, 1837, 184, not accessible; see *E. variabilis* Huxley, 1852.
1850: *E. polymorphus* Diesing, 1850a, 482–484.
1891: *E. cysticus* Huber, 1891b; *E. polymorphus*, renamed.
1896: *E. unilocularis*, see Huber, 1896a, 506, as syn. of *E. cysticus*.
(*g*) Other names:
1776: *Hydatides singulares* Pallas, 1766, 172–174; in animals and man; doubtful whether this should be recognized in a nomenclatural sense.
1805: *Hydatis erratica* Blumenbach, 1805a, 2 pp., 5 figs.; 1816a, 13; renamed *E. simiæ* Rudolphi, 1810a.
1810: *Finna idatoides* Brera, 1810a, 164–168, pl. 3, figs. 1–3, in man.
1825: "*Hydatis simplex* Home" of delle Chiaje, 1833a, 33; *Acephalocystis eremita sterilis*.
1844: ? *Astoma acephalocystis* Goodsir, 1844d, 282; supposed to be an hydatid.
1844: ? *Diskostoma acephalocystis* Goodsir in Gairdner, 1844a, 276; Goodsir, 1844d, 282; supposed to be an hydatid.
1852: *Echinococcus variabilis* Huxley, 1852a, 123; 1898a, 211, 213.
1875: *E. unilocularis* Haffter, 1875a, 365.
1882: *E. multiplex* Stiller, 1882, 352; in man.

Subspecies ECHINOCOCCUS GRANULOSUS MULTILOCULARIS (Leuckart, 1863).

1856: Die multiloculäre, ulcerirende Echinokokkengeschwulst Virchow, 1856, 84–95.
1863: *Echinococcus multilocularis* Leuckart, 1863, 360, 369, 370, fig. 110; Blanchard, 1886a, 447.
1868: Tumeur hydatique alvéolaire Carrière, 1868a; 1869a.
1875: *Echinococcus multilocularis hepatis* Haffter, 1875a, 362–371.
1883: *E. alveolaris* Klemm, 1883, not accessible; Blanchard, 1886a, 447.
1886: ? *E. racemosus* Leuckart, 1886, 795, fig. 334.
1896: *E. multilocularis exulcerans* Huber, 1896a, 506.
1896: *E. osteoklastes* Huber, 1896a, 506.
1905: *Tænia echinococcus alveolaris* (Klemm, 1883) Devé, 1905, Jan. 27, 128.

There is some difference of opinion in regard to the status of the multilocular echinococcus, some authors regarding it as specifically identical with the type form, others regarding it as distinct. From the views advanced, and because of its geographic distribution, it seems to me that this form may be given subspecific rank at least, and that it will probably be eventually recognized as of specific rank.

REJECTION OF NAMES.

Art. 32. A generic or a specific name, once published, can not be rejected, even by its author, because of inappropriateness. Examples: Names like *Polyodon*, *Apus*, *albus*, etc., when once published, are not to be rejected because of a claim that they indicate characters contradictory to those possessed by the animals in question.

Discussion. It is not infrequent that authors reject a name because they consider it nondescriptive or inappropriate, but the code does not recognize this as sufficient reason for such action. In this connection it is essential to recall that names are not definitions; they are simply handles by which objects are known. When an animal is known as *albus*, this name does not necessarily mean that the animal is white, but the combination of the letters *a-l-b-u-s* is simply a designation by which this animal is known.

This view appears very illogical, at first sight, to nonzoologists, but it is not so illogical as it may seem. On the contrary, it corresponds to everyday experience. If a man has the name Black, Green, or Brown, we do not change it on the ground that he is white, nor do we change the name of a negro named White simply because his skin is black. The nomenclaturalist sees no more reason for changing names of animals because they are not descriptive than other people do in case of family names of persons.

In a name we do not look for a summary of the characters of an animal; that summary we expect to find in the description, known technically as the "diagnosis."

The fact that "*Amœba coli*" was reported for other parts of the body than the colon has no bearing on the nomenclature of the species;

hence a change of name to "*Amœba dysenteriæ*," on basis of pathological findings, was not in accord with the code.

Were we to admit "appropriateness" as a prerequisite to a name and were we to take a vote to determine which of the 110 names of the parasite of hydatid disease is the most appropriate, it would be difficult to reach an agreement. Under the code, however, the subjective element of "appropriateness" is entirely eliminated.

Another point which some persons find difficulty in understanding is the fact that we do not concede to the author of a name any rights over that name which are not common to all zoologists. We recognize no name in nomenclature until it is published; when once published it is common property; if it has been published with lack of due consideration, its author is still responsible for its publication; after it is once published it becomes subject to the code, and were the code to give to the original author any rights over the name which other authors did not possess there would be little or no outlook for stability of that name until after its author's death; in the meantime the name may have come into general use, and if just before its author's death he decided to change it because a "more appropriate" name occurred to him or because of some other subjective reason, the nomenclature of the group in question might have to undergo a complete and unnecessary change.

In understanding this and all other points of nomenclature it is essential to recall that the question of "giving a man credit" for his work is of very secondary consideration. The entire code, while not ignoring justice, is based primarily upon practical rather than upon sentimental considerations, and is intended to prevent an inconvenience being caused to the entire scientific world rather than to protect an individual who works without a due regard of his responsibilities to future generations.

Art. 33. A name is not to be rejected because of tautonymy, that is, because the specific or the specific and subspecific names are identical with the generic name. Examples: *Trutta trutta*, *Apus apus apus*.

Discussion.—Some authors object to tautonymy, as *Trutta trutta*, *Heterophyes heterophyes*, on the ground that they do not consider such combinations euphoneous. Nomenclature, however, is neither poetry nor music. It is a practical, not a sentimental, proposition. By application of the law of priority tautonymy is sometimes inevitable, and as the law of priority is the keystone of nomenclature, tautonymy is accepted.

Personally I not only do not object to tautonymy, but I am strongly in favor of it. When we refer to *Tænia solium* it is a question of memory or of looking up references which recalls to our mind that *solium* is the type of *Tænia*. When we refer to *Heterophyes heterophyes*, however, the name itself shows us that we are dealing with the type of the genus.

Art. 34. A generic name is to be rejected as a homonym when it has previously been used for some other genus[a] of animals. Example: *Trichina* Owen, 1835, nematode, is rejected as homonym of *Trichina* Meigen, 1830, insect.

DISCUSSION.—This plan of rejecting a name on the ground that it has been used for some other genus has met with opposition from several sources, but though it may at first appear Draconian, it seems necessary. If identical generic names were accepted in different groups, on the ground that a protozoon would not be likely to be confused with a worm or an insect, we might be brought to a very involved position. Imagine, for instance, the lucidity of an article on the relation of zoology to medicine in which were discussed *Distoma a* as a protozoon, *Distoma b* as a medicinal sponge, *Distoma c* as a trematode, *Distoma d* as a tapeworm, *Distoma e* as a nematode, *Distoma f* as a thorn-headed worm, *Distoma g* as a mite, *Distoma h* as a mosquito, and *Distoma i* as a poisonous snake. Any code of nomenclature which would make such a condition theoretically possible would bring about the very confusion which nomenclature seeks to avoid.

Protest has been raised against rejecting *Trichina*, 1835, as generic name of *Trichina spiralis;* that this rejection is unfortunate may be readily admitted, but with an earlier insect genus named *Trichina*, 1830, zoologists can hardly be expected to admit *Trichina* as valid name for a nematode genus.

Mallory proposed *Cyclaster*, 1904, as generic name for the organism which he found in a case of scarlet fever, but as this same name was used in 1856 for a genus of echinoderms, Mallory was entirely justified in recently changing the name of his genus to *Cyclasterion*, 1905.

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[a] Besides the special journals and special nomenclators of various groups, authors will find the following publications very valuable in determining whether any given generic or supergeneric name is preoccupied, and if authors will consult these works before publishing new names, considerable confusion and later change of names will be avoided:

C. D. Sherborn, *Index animalium sive index nominum quæ ab A. D. 1758, generibus et speciebus animalium imposita sunt. Societatibus eruditorum adiuvantibus a* Carolo Davis Sherborn *confectus. Sectio I a kalendis januariis, 1758, usque ad finem decembris, 1800.* Cantabrigiæ, 1902, 8°.

S. H. Scudder, *Nomenclator zoologicus. An alphabetical list of all generic names that have been employed by naturalists for recent and fossil animals from the earliest times to the close of the year 1879.* In 2 parts: I. Supplemental list. II. Universal index. Washington, 1882, 8°.

C. O. Waterhouse, *Index zoologicus. An alphabetical list of names of genera and subgenera proposed for use in zoology as recorded in the Zoological Record, 1880–1900, together with other names not included in the Nomenclator zoologicus of S. H. Scudder.* Compiled by Charles Owen Waterhouse and edited by David Sharp. London, 1902, 8°.

The Zoological Record, XXXVIII [et sequ.]. *Being records of zoological literature relating chiefly to the year 1901* [et sequ.]. London, 1902 [et sequ.], 8°. Index to names of new genera and subgenera.

Register zum zoologischen Anzeiger. Herausgegeben von J. V. Carus, Jahrgang 1–10 (1878–1887), 11–15 (1888–1892), 16–20 (1893–1897), 21–25 (1898–1902). Leipzig, 1889–1893, 1899, 1903, 8°.

Art. 35. A specific name is to be rejected as a homonym when it has previously been used from some other species of the same genus. Example: *Tænia ovilla* Rivolta, 1878 (n. sp.) is rejected as homonym of *T. ovilla* Gmelin, 1790.

When in consequence of the union of two genera, two different animals having the same specific or subspecific name are brought into one genus, the more recent specific or subspecific name is to be rejected as a homonym.

Discussion.—This rule scarcely needs any justification. To retain the same specific name for two or more different species in one genus would be to invite hopeless confusion.

As a general proposition it is well to avoid the introduction of a new specific name into a genus if the same name is used in another genus of the same family.

Art. 36. Rejected homonyms[a] can never be again used. Rejected synonyms can again be used in case of the restoration of erroneously suppressed groups. Example: *Tænia Giardi* Moniez, 1879, was suppressed as a synonym of *Tænia ovilla* Rivolta, 1878; later it was discovered that *Tænia ovilla* was preocupied (*Tænia ovilla* Gmelin, 1790). *Tænia ovilla*, 1878, is suppressed as a homonym, and can never again be used; it was stillborn and can not be brought to life, even when the species is placed in another genus (*Thysanosoma*). *Tænia Giardi*, 1879, which was suppressed as a synonym, becomes valid upon the suppression of the homonym *Tænia ovilla* Rivolta.

Discussion.—This rule is opposed by some authors, but it is in the interest of uniformity. It insures the use of the same specific name for a given species by authors who recognize the use of subgenera, as is used by authors who do not recognize subgenera.

Recommendations.—It is well to avoid the introduction of new generic names which differ from generic names already in use only in termination or in a slight variation in spelling which might lead to confusion. But when once introduced such names are not to be rejected on this account. Examples: *Picus*, *Pica; Polyodus*, *Polyodon*, *Polyodonta*, *Polyodontas*, *Polyodontus; Macrodon*, *Microdon.*

The same recommendation applies to new specific names in any given genus. Examples: *necator*, *necatrix; furcigera*, *furcifera*; *rhopalocephala*, *rhopaliocephala*.

If from the radical of a geographic name two or more adjectives are derived, it is not advisable to use more than one of them as specific name in the same genus, but if once introduced, they are not to be rejected on this account. Examples: *hispanus*, *hispanicus; moluccensis*, *moluccanus; sinensis*, *sinicus*, *chinensis; ceylonicus*, *zeylanicus*.

The same recommendation applies also to other words derived from the same radical and differing from each other only in termination or by a simple change in spelling. Examples: *cæruleus*, *cœruleus; silvestris*, *sylvestris*, *silvaticus*, *sylvaticus; littoralis*, *litoralis; autumnalis*, *auctumnalis; dama*, *damma; fluvialis*, *fluviatilis*, *fluviaticus*.

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[a] A homonym is one and the same name for two or more different things. Synonyms are different names for one and the same thing.

APPENDIX.

A. It is very desirable that the proposition of every new systematic group should be accompanied by a diagnosis, both individual and differential, of said group in English, French, German, Italian, or Latin. This diagonsis should state in what museum the type specimen has been deposited and should give the museum number of said specimen.

B. In publications issued in any other language than English, French, German, Italian, or Latin it is very desirable that the explanation of figures be translated into one of these tongues.

C. The metric system of weights and measures and the centigrade thermometer of Celsius are adopted as standard. The *micron* (0.001mm.), represented by the Greek letter μ, is adopted as the unit of measure in microscopic work.

D. The indication of enlargement or of reduction, which is very desirable for the comprehension of an illustration, should be expressed in figures rather than by mentioning the system of lenses used.

E. The indication of enlargement or reduction of an object is usually linear. The sign of multiplication is used for enlargement, and the fraction for reduction. Examples: $\times 50$ indicates that the object is enlarged 50 times; $\frac{1}{50}$ indicates that it is reduced to $\frac{1}{50}$th.

If it is desired to specify that the enlargement is linear, surface, or mass, this may be done as follows: $\times 50^1$ indicates linear enlargement; $\times 50^2$ indicates surface enlargement; $\times 50^3$ indicates mass enlargement.

F. Transcription of Greek words:

The following table indicates the manner in which Greek words should be transcribed:

ε = e (ὑάλεος) — Hyalea, *not* Hyalaea.
η = e (πειρήνη) — Pirena, *not* Pirina.
final η = a (πειρήνη) — Pirena, *not* Pirene.
θ = th (τηθύς) — Tethys, *not* Tetys.
ι = i (βάλιος) — Balia, *not* Balea.
κ = c (ἱπποκρήνη) — Hippocrena, *not* Hippochrenes.
ξ = x (ξένος) — Xenus, Xenophora.
ρ = r (πτερόν) — Pterum.
υ = y (ὑβός) — Hybolithus, *not* Hibolites.
αι = ae (λιμναῖος) — Limnaea, *not* Limnea.
αυ = au (γλαυκός) — Glaucus.
ει = i (χεῖλος) — Chilostomum, *not* Cheilostoma.
ευ = eu (εὖρος) — Eurus.

ῳ, οι = oe (οἰκέω) — Dioeca, Dendrœca, *not* Dioica, Dendroica.
final *ον = um* (ἐφίππιον) — Ephippium, *not* Ephippion.
final *ος = us* (ὀμφαλός) — Euomphalus, *not* Euomphalos.
ου = u (λουτήριον) — Luterium, *not* Lotorium.
γγ = ng (ἀγγαρεία) — Angaria.
γχ = nch (ἀγχιστομον) — Anchistomum, *not* Angistoma.
γκ = nc (ἄνκιστρον) — Ancistrodon, *not* Agkistrodon.
ῥ = rh (ῥέα) — Rhea.
ἑ = he (ἑρμαία) — Hermæa, *not* Ermæa.

G. Transcription of geographic and proper names.

The geographic names of nations which employ the Latin characters are to be written with the orthography of the country in which they originate.

The following rules apply only to the geographic names of countries which have no true alphabet or which use letters that are different from the Latin alphabet.

Names of places, however, which have been established by long usage preserve their usual orthography. Examples: *Algiers*, *Moscow*.

1. The vowels *a*, *e*, *i*, and *o* are pronounced as in French, Italian, Spanish, or German. The letter *e* is never mute.

2. The French sound *u* is represented by *ü* with dieresis, as in German.

3. The French sound *ou* is represented by *u*, as in Italian, Spanish, German, etc.

4. The French sound *eu* is represented by *œ*, pronounced as in the French word *œil*.

5. The long sound of a vowel is indicated by a circumflex accent; the interrupted sound is indicated by an apostrophe.

6. The consonants *b*, *d*, *f*, *j*, *k*, *l*, *m*, *n*, *p*, *q*, *r*, *t*, *v*, and *z* are pronounced as in French.

7. The letters *g* and *s* always have the hard sound, as in the French words *gamelle* and *sirop*.

8. The sound represented in French by *ch* is designated by *sh*. Examples: *sherif*, *Kashgar*.

9. *Kh* represents the harsh guttural; *gh* represents the soft guttural of the Arabs.

10. *Th* represents the sound which terminates the English word *path* (*θ* in Greek). *Dh* represents the sound which commences the English word *those*.

11. Aside from such employment (9, 10) of the letter *h* modifying the letter which precedes it, *h* is always aspirated; the apostrophe is therefore never used before a word commencing with *h*.

12. The semivowel represented by *y* is pronounced as in *yole*.

13. The semivowel *w* is pronounced as in the English word *William*.

14. The double sounds *dj*, *tch*, *ts*, etc., are indicated by letters representing the sounds which compose them. Example: *Matshim*.

15. The *ñ* is pronounced *gn*, as in *seigneur*.

16. The letters *x*, *c*, and *q* are not used, since they are duplicates of other letters representing the same sounds; but *q* may serve to indicate the Arabic *qaf* and the soft aspirate may be used to represent the Arabic *aïn*.

An attempt should be made to indicate as exactly as possible, by means of the letters given above, the local pronunciation without trying to give a complete representation of all the sounds which are heard.

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